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Ninyo & Moore

PREFERENTIAL PATHWAY STUDY AND WORKPLAN FOR ADDITIONAL SOIL AND GROUNDWATER EVALUATION QUALITY TUNE-UP 14901 EAST 14TH STREET SAN LEANDRO, CALIFORNIA

PREPARED FOR:
The City of San Leandro
835 East 14th Street
San Leandro, California 94577

PREPARED BY:
Ninyo & Moore
Geotechnical and Environmental Sciences Consultants
1956 Webster Street, Suite 400
Oakland, California 94612

January 22, 2007
Project No. 401007003

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Mr. Toyin Fawehinmi, P.E. Associate Engineer
City of San Leandro
Engineering and Transportation Department
835 East 14th Street
San Leandro, California 94577

Subject: Preferential Pathway Study and Workplan for Additional Soil and Groundwater Evaluation, Quality Tune Up, 14901 East 14th Street, San Leandro, California.

Reference: Alameda County Environmental Health Services, 2006, Letter to Ms. Diana Pagano, Fuel Leak Case No. RO0002925, Quality Tune Up, 14901 East 14th Street, San Leandro, CA: dated October 6.

Dear Mr. Fawehinmi:

Ninyo & Moore is pleased to present this Preferential Pathway Study and Workplan for an additional groundwater and soil evaluation for Quality Tune Up located at 14901 East 14th Street in the San Leandro, Alameda County, California. The objective of this Preferential Pathway Study and Workplan is to satisfy the Alameda County Environmental Health Services requirements in the letter referenced above.

We appreciate the opportunity to be of service to the City of San Leandro on this project.

Sincerely,
NINYO & MOORE

Brian J. Harvey
Staff Environmental Scientist

Kris M. Larson, P.G.
Sr. Project Environmental Geologist

BJH/KML/dhi

Distribution: (1) Addressee
(1) Mr. Steven Plunkett, Alameda County Environmental Health Care Services

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1. INTRODUCTION

This Preferential Pathway Study and Workplan for Additional Soil and Groundwater Evaluation, for the property located at 14901 East 14th Street in San Leandro, California (site), was conducted in accordance with the Alameda County Environmental Health Services (ACEHS) request for a preferential pathway study and workplan for additional groundwater evaluation (ACEHS, 2006). A copy of the letter from ACEHS requesting this work is presented in Appendix A. The Preferential Pathway Study includes a well survey, which locates wells within a one-quarter mile radius of the site, and a utility trench survey, which locates utility trenches on-site and adjacent to site boundaries. The Additional Soil and Groundwater Evaluation Workplan discusses former environmental activities on-site and the scope of services for an off-site evaluation, which will help delineate the lateral and vertical extent of the total petroleum hydrocarbon (TPH) impacted ground on-site.

2. SITE INFORMATION AND BACKGROUND

The site consists of an approximately 10,556 square feet, triangular-shaped parcel (Figure 1). The site contains one single-story structure encompassing approximately 900 square feet occupied by Quality Tune Up, an automobile service and smog inspection facility (Figure 2).

The site was occupied by Riley's Gasoline Station from as early as 1948 until approximately 1950, when the present day structure was constructed and was occupied by Red's Flying A Service Gas Station (Ninyo & Moore, 2004). Other businesses that have operated on-site as a gasoline and/or service station include Phillip's 66 (1974 to 1976), Electrotune (1976 until sometime prior to 1981), and Quality Tune Up and Smog Check Center (1981 to present).

Several environmental investigations have been conducted on-site since 1993. A discussion of environmental reports prepared for the site is below.

2.1. Previous Soil and Groundwater Investigations

Hageman Aguiar, Inc., (HA) prepared a Limited Soil Investigation Report in October of 1993 (HA, 1993). HA reported three gasoline underground storage tanks (USTs) were pre-

sent on-site, however, had not been used in 10 years. A fourth UST (reported to be either 200-gallon or 500-gallon capacities), has also been reported at the subject site. Refer to Figure 2 for the location of the four former USTs.

Subsurface investigation activities performed by HA included advancement of four soil borings (B-1 through B-4) (Figure 2) to a depth of approximately 15 feet below ground surface (bgs), in the vicinity of the USTs. Soil samples collected were analyzed for total petroleum hydrocarbons as gasoline (TPH-G) and benzene, toluene, ethylbenzene, and total xylenes (BTEX). The following maximum concentrations were reported from the site analytical data: TPH-G, 180 milligrams per kilogram (mg/kg); benzene, 230 micrograms per kilograms (µg/kg); toluene, 320 µg/kg; ethylbenzene, 560 µg/kg; and total xylenes, 1,400 µg/kg. These results, however, were reported from a saturated soil sample collected below the water table. The near surface soil samples collected (<5 feet bgs) did not contain concentrations of petroleum hydrocarbons above the laboratory reporting limits (RLs). HA indicated the base of two of the USTs were approximately located at the top of the groundwater table, which was reported at 13 feet bgs. HA concluded the petroleum hydrocarbons concentrations reported in soil samples collected was due to an on-site release or migration of contamination from an off-site source.

Based on the results of soil sampling provided in the 1993 Limited Soil Investigation Report, HA prepared a Workplan (HA, 1996) and performed an Additional Subsurface Investigation in January 1997 (HA, 1997) to further evaluate soil conditions in the vicinity of USTs, underground piping and existing pump islands. Six borings (GP-1 through GP-6) (Figure 2) were advanced to depths of approximately 15 feet bgs and the following maximum concentrations were reported from the soil samples collected on-site: TPH-G was reported at 29 mg/kg, benzene at 41 µg/kg, toluene at 8 µg/kg, ethylbenzene at 12 µg/kg, and total xylenes at 31 µg/kg. Methyl tertiary-butyl ether (MTBE) was not reported in soil samples collected and analyzed above the RL. As reported in the 1993 Limited Soil Investigation Report, the near surface soil samples collected (<5 feet bgs) did not contain concentrations of petroleum hydrocarbons above the RLs. Grab groundwater samples were

collected from three (GP-1W, GP-4W, and GP-6W) of the six borings. The highest constituent concentrations were reported in samples collected from GP-6W and included 210,000 micrograms per liter (µg/L) of TPH-G, 200 µg/L of benzene, 180 µg/L of toluene, 180 µg/L of ethylbenzene, and 420 µg/L of total xylenes. MTBE was not reported above the RLs.

HA reported the removal and sampling activities associated with four USTs in a Tank Closure Summary Report, dated October 13, 1997 (HA, 1997). Two of the tanks were of single-wall steel construction with 10,000-gallon capacity and stored gasoline. The third UST was of single-wall fiberglass construction with a 5,000-gallon capacity and also stored gasoline. The fourth UST was of steel single-wall construction with a 500-gallon capacity used to store waste oil. Permit applications for this UST indicate a capacity of 200 gallons. The tanks were noted to be in good condition upon their removal with no signs of holes or rust. Soil samples collected from the excavated area and soil pile generated from excavation activities reportedly contained minor concentrations of petroleum hydrocarbons, and officials with the City of San Leandro Fire Department Hazardous Materials Division indicated that no further overexcavation was required. The excavated soil, which was approximately 300 cubic yards, was used as backfill material along with imported engineered base rock from the Dumbarton Quarry. The report did not indicate if the subgrade UST-associated dispenser piping was removed at the time of the UST removal and excavation activities.

Ninyo & Moore performed a Limited Phase 2 Environmental Site Assessment in June of 2005 (Ninyo & Moore, 2005) to evaluate whether a release of petroleum hydrocarbons from historic/current activities on- and off-site has occurred and impacted soil and groundwater on-site.

Subsurface investigation activities performed by Ninyo & Moore included drilling of nine soil borings (NM-1 through NM-9) (Figure 2) within the site boundaries and laboratory analysis of soil and groundwater samples collected from the borings. Soil samples were collected from Borings NM-3, NM-4, NM-7, and NM-9. Groundwater samples were collected from all borings on-site. Soil and groundwater samples were analyzed for TPH-G, total pe-

troleum hydrocarbons as diesel (TPH-D), total petroleum hydrocarbons as motor oil (TPH-MO), BTEX, and MTBE.

TPH-G concentrations were reported in four borings and ranged from 2,100 µg/L in NM-4 to 20,000 µg/L in NM-8. MTBE concentrations were reported between 1.52 µg/L in NM-5 to 5.5 µg/L in NM-8. TPH-D was reported in all groundwater samples ranging from 250 µg/L in NM-9 to 60,000 µg/L in NM-3. TPH-MO was reported in borings ranging in concentrations from 280 µg/L in NM-6 to 27,000 µg/L in NM-3.

Soil samples were collected from four of the boring locations (NM-3, NM-4, NM-7, and NM-9) at approximately 2 and 5 feet bgs and at the soil water interface (approximately 15 feet bgs). TPH-D and BTEX were not reported above RLs in soil samples collected on-site. Minor concentrations of TPH-MO were reported in several soil samples collected ranging from 19 mg/kg to 53 mg/kg. TPH-G and MTBE were detected in a saturated soil sample collected below the water table and is not considered representative of soil conditions.

3. PREFERENTIAL PATHWAY STUDY

A Preferential Pathway Study, including an underground utility trench survey and a well survey, were conducted to evaluate underground utilities in the site vicinity; and active, abandoned, and destroyed wells within a one-quarter mile radius of the site. Utility maps were requested from Pacific Gas and Electric (PG&E) for gas and electric utility trenches, American Phone & Telegraph Company (AT&T) for fiber optic cable and phone line utility trenches, East Bay Municipal Utility District (EBMUD) for water line utility trenches, Oro Loma Sanitary District (OLSD) for sanitary sewer trenches, and Alameda County for storm drain line utility trenches for the site and site vicinity. The City of San Leandro also provided information for utilities located beneath the site. The utility trenches are located on an Underground Utility Trench Location Map (Figure 3).

The Alameda County Public Works Agency (ACPWA) and the California Department of Water Resources (DWR) were contacted regarding the location of wells for the well survey.

3.1. Underground Utility Trench Survey

A PG&E gas utility map for the site and site vicinity reported a subsurface gas line entering beneath the site from East 14th Street along the east edge of the site and bearing southwest approximately 70 feet. The pipeline terminates at the south end of the on-site building. The pipeline extends approximately 10 feet northeast beneath the sidewalk on East 14th Street, and connects to a main gas line bearing northwest-southeast beneath the southwestern edge of East 14th Street. The PG&E gas utility map also indicated a subsurface gas line entering beneath the site from Hesperian Boulevard at the west site boundary and bearing east approximately 50 feet. The pipeline terminates near the southeast edge of the site along 150th Avenue. The pipeline extends approximately 60 feet west beneath the sidewalk on Hesperian Boulevard and connects to a high pressure main gas line bearing north-south beneath the center of Hesperian Boulevard. A PG&E electric utility map for the site and site vicinity indicated that electric utility lines in this area are above ground with the exception of one underground riser bearing east-west near the southeast intersection of Hesperian Boulevard and East 14th Street. At its closest point, this underground riser is approximately 20 feet from the northwest corner of the site. According to PG&E, their underground utilities are generally buried between 24 to 36 inches bgs.

An AT&T underground utility map indicates a 1½-inch duct telephone and cable line entering beneath the site from East 14th Street near the eastern corner of the site at 150th Avenue and East 14th Street. This line trends southwest as it enters the site for approximately 10 feet, then bears west for approximately 7 feet before it shifts back to bearing southwest for approximately 40 feet. At this point the line has a drop cable connected to the former gasoline station service building, then bears northwest for approximately 10 feet and terminates near the southwestern corner of the former 10,000-gallon UST location. The line extends approximately 5 feet northeast from the edge of the site along East 14th Street where it connects to a junction box and 12–3½-inch ducts bearing northwest-southeast along East 14th Street. South of the junction box, the ducts split and 16–3½-inch ducts bear northeast-southwest under the sidewalk on the southeast edge of the site. According to the AT&T map, there is also an abandoned underground utility line bearing north-south under the side-

walk on the west edge of the site. In addition, there are underground lines with 6–3½-inch ducts, and 33–4-inch ducts bearing north-south underneath Hesperian Boulevard approximately 15 and 20 feet, respectively, from the west edge of the site. According to the AT&T map provided, utilities are buried approximately 27 inches bgs.

An EBMUD water systems map for the site and site vicinity reported a 2-inch-diameter subsurface water line bearing northeast-southwest and entering beneath the northeast border of the site along East 14th Street. This water line trends southwest as it enters the site and continues for approximately 25 feet until it terminates near the north edge of the former 5,000-gallon gasoline UST location. This line connects to a 2-inch-diameter water line that is buried approximately 62 inches bgs and runs parallel to the sidewalk on the west side of East 14th Street, approximately 10 feet from the northeast border of the site. The line runs southeast across 150th Avenue where it drops down to approximately 75 inches bgs and connects to an 8-inch-diameter water main bearing northeast-southwest which is also buried approximately 75 inches bgs. The 8-inch line runs northeast-southwest underneath the southern edge of 150th Avenue, approximately 60 feet from the southeast border of the site, until it reaches Hesperian Boulevard and turns south. This 8-inch-diameter water line is surrounded by a 30-inch-diameter protective casing where it passes underneath East 14th Street. The EBMUD map also reported a 30-inch-diameter water line bearing north-south underneath Hesperian Boulevard approximately 40 feet from the western border of the site. This 30-inch-diameter water line is located approximately underneath the centerline of Hesperian Boulevard and is approximately 60 inches deep where is crosses the 2-inch water line approximately 50 feet northwest of the site. As this 30-inch line runs south, it rises to approximately 48 inches when it reaches the south end of the 150th Avenue and Hesperian Boulevard intersection.

An OLSD sewer systems map for the site and site vicinity reported an 8-inch-diameter vitrified clay pipe bearing north-south underneath Hesperian Boulevard approximately 55 feet from the western boundary of the site. This 8-inch line is buried approximately 76 inches bgs at the southwest corner of the East 14th Street and Hesperian Boulevard inter-

section. As the line heads south along Hesperian Boulevard, it drops to approximately 112 inches bgs near the center of the intersection of 150th Avenue and Hesperian Boulevard. The OLSD map also reported a 12-inch-diameter vitrified clay pipe bearing northeast-southwest underneath 150th avenue approximately 55 feet from the southeast boundary of the site. This 12-inch line is buried approximately 80 inches bgs as it crosses East 14th Street, and drops to approximately 112 inches bgs near the center of the intersection of 150th Avenue and Hesperian Boulevard where it appears to connect to the 8-inch line bearing north-south underneath Hesperian Boulevard. The OLSD map reported an additional 8-inch-diameter vitrified clay pipe bearing northwest-southeast underneath the northeast edge of East 14th Street, approximately 85 feet from the northeast boundary of the site. This 8-inch line is buried approximately 77 inches bgs near the northeast corner of the East 14th Street and Hesperian Boulevard intersection, and rises to approximately 65 inches bgs at the northeast corner of the 150th Avenue and East 14th Street intersection.

A map provided by the City of San Leandro depicting storm drain lines for the site and site vicinity reported a storm drain inlet on the southeast edge of the site along the northern edge of 150th Avenue. This storm drain inlet is attached to a storm drain line bearing northeast-southwest underneath the sidewalk on the northern edge of 150th Avenue. At the southern corner of the site, this storm drain line connects to another storm drain line bearing north-south approximately 5 feet inside the western boundary of the site along Hesperian Boulevard. According to ACPWA, storm drain lines in the vicinity of the site are buried approximately 72 to 96 inches bgs.

3.2. Well Survey

The ACPWA and DWR were contacted regarding the location of wells in a one-quarter mile radius of the site for a well survey. Both agencies responded with well information.

A list of over 300 wells within the site region was obtained from ACPWA–Water Resources Section and included well numbers, street addresses, well owner, well type, well depth, depth to water level, well diameter, and longitude/latitude coordinates. This list also in-

cluded the well drilling date and permit number for some of the wells listed. Since the well information from ACPWA did not contain information pertaining to screening depths or sanitary seal depths of wells, information was also requested from the DWR regarding wells within a one-quarter mile radius of the site. The information obtained from the DWR contained well logs and driller reports for some of the wells listed in the ACPWA database. A summary of information obtained from both ACPWA and the DWR can be seen in Table 1. Locations of wells within a one-quarter mile radius of the site can be seen in Figure 4.

3.2.1. Alameda County Public Works Agency – Water Resources Section

A list of over 300 domestic, irrigation, municipal, industrial, cathodic, destroyed, abandoned, test, groundwater monitoring, extraction/vapor, piezometer, and extraction/vapor recovery wells was provided by the ACPWA–Water Resources Section. Forty-four wells were listed within the search radius of one-quarter mile in 17 separate well locations (Figure 4). These wells were listed as either cathodic, groundwater monitoring, irrigation, test, or destroyed. Well information and parameters obtained from the ACPWA, included permit number, well ID number, township range and section (state well number), well address, well owner, the date of last data update, well drilling date, depth of well, depth to water in well, well diameter, and well type (monitoring, irrigation, etc.). Information regarding the screened interval depth and depth of sanitary seal for several wells was obtained from the DWR. Screened interval or sanitary seal information was not available from either the ACPWA or the DWR for 24 of the 44 wells discovered within a one-quarter mile radius of the site. Additionally, 43 of the wells were listed as active, and one well was listed as destroyed. However, because the most recent update to the well information database was in 1998, it is unlikely that all 43 of the wells are currently active.

Seven of the well locations (No. 4, No. 9, No. 11, No. 12, No. 13, No. 14, and No. 15, Figure 4) containing 12 wells total, were located either adjacent to or downgradient (west or southwest of the site) (Figure 4). Six of the seven well locations were reported as active (No. 4, No. 9, No. 12, No. 13, No. 14, and No. 15, Figure 4) and one well was

reported as destroyed. The destroyed well was located approximately 700 feet south of the site (No. 11, Figure 4). Five of the active well locations were reported as irrigation wells varying in total depth from 24 to 60 feet bgs (No. 9, No. 12, No. 13, No. 14, and No. 15, Figure 4). Screening depth information was available for one of the wells located approximately 1,100 feet southwest of the site and was reported between 24 to 56 feet bgs (No. 14, Figure 4). The sanitary seal depth was reported to be located at 20 feet bgs for well No. 14. Additionally, a cluster of six groundwater monitoring wells was located approximately 300 feet south of the site (No. 4, Figure 4). These wells vary in total depth from 17 to 23 feet bgs. No information was available regarding the screened interval or sanitary seal depth for any of the six wells in this well location.

Five of the wells were located crossgradient and northwest of the site in two different well locations (No. 10 and No. 16, Figure 4). One of the five wells was reported as an irrigation well approximately 800 feet northwest of the site (No. 10, Figure 4). This irrigation well had a reported total depth of 100 feet. No information was available regarding the screened interval or sanitary seal depth for this well. The other four wells were a cluster of groundwater monitoring wells located about 500 feet northwest of the site (No. 16, Figure 4). All four wells were 20 feet deep and reported water levels of 10, 11, and 12 feet bgs. No information was available regarding the screened interval or sanitary seal depth for any of these four wells.

Southeast and crossgradient from the site were an additional four wells in two different well locations (No. 1 and No. 7, Figure 4). One of these wells was a cathodic well belonging to PG&E located approximately 1,200 feet southeast from the site (No. 1, Figure 4). This cathodic well was reported as being 120 feet deep. A cluster of three wells was located approximately 275 feet southeast of the site (No. 7, Figure 4). This cluster included two test wells, each 21 feet deep, and one groundwater monitoring well which was 20 feet deep. All three wells were screened at depths from 11 to 21 feet bgs and have a sanitary seal to 7 feet bgs.

Twenty-three wells were located upgradient and either north, northeast, or east from the site in six different well locations (No 2, No. 3, No. 5, No. 6, No. 8, and No 17, Figure 4). Three of these wells were irrigation wells with total depths ranging from 26 to 40 feet bgs (No. 5, No. 6, and No. 17, Figure 4). The closest of these wells to the site (No. 6), is approximately 800 feet northeast of the site. Well No. 17 was reported to have a screened interval of 20 to 40 feet bgs and a sanitary seal at 10 feet bgs. A cluster of six groundwater monitoring wells was located approximately 100 feet northeast of the site (No. 2, Figure 4). These wells vary in total depth from 23 to 24 feet bgs. No information was available regarding the screened interval or sanitary seal depth for these wells. An additional groundwater monitoring well was located approximately 125 feet northeast of the site (No. 3, Figure 4). This well had a total depth of 19 feet, a screened interval of 9 to 19 feet bgs, and a sanitary seal at 7 feet bgs. A cluster of 13 groundwater monitoring wells was also located approximately 125 feet east of the site (No. 8, Figure 4). These wells had total depths ranging from 19 to 23 feet bgs, screened intervals ranging from 7 to 22.5 feet bgs, and sanitary seals ranging from 3 to 8 feet bgs.

A copy of the well drillers reports and boring logs are presented in Appendix B.

4. ADDITIONAL SOIL AND GROUNDWATER EVALUATION WORKPLAN

The objective of the Additional Soil and Groundwater Evaluation is to further define the vertical and lateral extent of the constituents of concern (COCs) including TPH-G, BTEX, TPH-D, TPH-MO, and fuel oxygenates including MTBE, using discreet sampling techniques from borings located on- and off-site. This proposed sampling technique will facilitate three dimensional understanding of COCs in the site vicinity. Our scope of services for the evaluation as follows.

5. SCOPE OF SERVICES

The soil and groundwater evaluation will involve several tasks, designed to evaluate soil and groundwater conditions beneath areas in the site vicinity. These individual tasks include the following:

5.1. Off-Site Access Agreements for Groundwater Sampling

Off-site access agreements will be obtained by the City of San Leandro and Ninyo & Moore, if needed. If off-site property owners do not allow boring installation on their properties, the Alameda County Department of Environmental Health will be requested to intervene on behalf of the City of San Leandro and request property access for Ninyo & Moore.

5.2. Site Specific Health and Safety Plan

A Ninyo & Moore Site Specific Health and Safety Plan (SSHSP) will be prepared in advance of field activities to discuss potential health and safety issues that may arise during field activities. The SSHSP will include a description of the site, project organization and coordination, physical and chemical hazard evaluation, communication procedures, personnel decontamination procedures, identification of a field team leader and field team members and emergency contacts, including a map and directions to the nearest hospital from the site. Field team members and personnel visiting the site during field activities will be required to sign the signature page in the SSHSP after a tailgate meeting discussing the SSHSP.

5.3. Utility Clearance

Direct push equipment will be advanced to assess groundwater conditions during the groundwater evaluation. The locations of the borings will be marked in the field prior to conducting a utility clearance. Underground Service Alert will be contacted, and they will contact local utility companies to identify the locations of underground utilities in the proposed work areas prior to drilling. As-built utility drawings showing the locations of aboveground and underground utilities will be also reviewed, if available. If appropriate, site personnel will be contacted to identify the locations of underground utilities around proposed drilling locations. A private utility locating service will also be used to identify the location of underground piping and utilities. Where underground utilities or structures are present beneath proposed work areas, the drilling locations will be relocated to unobstructed areas.

5.4. Cone Penetrometer Testing

Cone penetrometer testing (CPT) will be conducted to evaluate the lithology and produce a 3-dimensional image of the subsurface within the site vicinity. According to boring logs for previous subsurface investigations at the subject site, the site is underlain by alluvium, which primarily consists of clay, silt, and sand. Boring logs contained in subsurface reports indicate 2 feet of asphalt and gravels beneath which are clays and clayey sands to the maximum depth of exploratory borings (16 feet). Ninyo & Moore's recent subsurface evaluation indicated similar soil conditions with the presence of clayey alluvium with some silts and gravels to the total depth of exploration (approximately 16 to 20 feet bgs). In order to confirm the depth and lateral continuity of the clay aquitard/sand aquifer boundary, four CPT borings will be installed along a line dissecting the site from northeast to southwest (Figure 2). The thickness of the aquitard will be confirmed, as well as potential water bearing zones within the aquitard. Water bearing zones within the aquitard will be sampled during a soil and groundwater sampling event following the CPT evaluation.

The CPT equipment will be decontaminated using a steam cleaner between borings.

5.5. Soil and Groundwater sampling

Subsequent to the CPT evaluation, discreet groundwater samples will be collected from an additional eight on- and off-site borings. Five of the borings will be located downgradient of the USTs and the dispenser island, in the general downgradient flow direction of the current contaminant plume (toward the south/southwest). One boring will be located adjacent to the former UST location, and two will be upgradient from the site adjacent to East 14th Street. Past groundwater monitoring events in the site vicinity have indicated that groundwater flow is toward the southwest.

Soil and groundwater samples will be collected using a dual-tube sampler, which will allow soil to be classified at each boring. Soil samples will be collected from the soil/groundwater interface and from 5 feet above the soil/groundwater interface. A discreet groundwater sample will be collected from each coarse grained water bearing zone within the aquitard

identified during the CPT evaluation, and at 5-foot intervals within significant water bearing units. Water quality parameters, including pH, specific conductance, and temperature will be field measured until they stabilize prior to collection of groundwater samples. Groundwater samples will be collected with a peristaltic pump or disposable Teflon™ bailer, and the contents will be transferred into the appropriate containers. Soil and groundwater sample containers will be labeled with the project name, location, boring number, sample depth, sampling date/time, and sampler's initials. The sample containers will be placed into an insulated cooler containing ice for transport to the analytical laboratory. Chain of custody documentation will be completed and will accompany the groundwater samples to the analytical laboratory.

Soil and groundwater sampling equipment will be decontaminated between sampling intervals with a steam cleaner. Soil cuttings and decontamination water will be placed into an appropriate container for temporary storage at the site. Waste materials will be properly disposed of at a permitted off-site facility, after wastes have been profiled using analytical data results.

Upon completion of sampling, the ACPWA will be alerted prior to backfilling the borings. The borings will be backfilled according to ACPWA guidelines for water wells in General Ordinance Code, Chapter 6.88 Water Wells. The top of the backfilled borings will match surrounding materials and existing grade.

5.6. Laboratory Analyses

Soil and groundwater samples obtained during the field activities will be analyzed by a California state-certified analytical laboratory. Samples will be analyzed for fuel oxygenates, including ethylene dibromide, ethylene dichloride, MTBE, tert-amyl methyl ether, ethyl tert-butyl ether, diisopropyl ether, ter-butyl alcohol, ethanol, and BTEX using EPA Method 8260B; and TPH-D, TPH-G, and TPH-MO using EPA Method 8015M.

5.7. Report Preparation

An Additional Soil and Groundwater Evaluation Report will be prepared upon completion of the field activities and receipt of laboratory analyses. The report will summarize the results of the field work, include tables of groundwater analytical test results, and present figures showing the distribution and groundwater constituent concentrations. Detailed geologic cross-sections will be prepared using data collected from the CPT and dual-tube sampling systems. The report will also present findings, conclusions, recommendations for additional work, as warranted, and will include appendices presenting boring logs and certified analytical laboratory reports. The report will also contain a hydrogeologic assessment of the groundwater within the site vicinity, and a discussion of site interim remediation strategies, if necessary.

6. SUMMARY AND CONCLUSIONS

Previous environmental investigations have reported elevated concentrations of TPH, BTEX, and MTBE constituents in groundwater samples collected on-site, and regional groundwater reportedly flows toward the southwest, with depth ranging between 9 feet to 13 feet bgs.

Maps and data collected and reviewed during our preferential pathway study, indicated several subsurface utility trenches connecting to and encroaching on-site. The utilities included a City of San Leandro storm drain line, a PG&E natural gas line, an EBMUD water line, and an AT&T cable/phone line. The AT&T cable/phone line, one of the PG&E natural gas lines, and an EBMUD water line enter the site from the northeast boundary of the site along East 14th Street, and connect to larger mains under East 14th Street. The City of San Leandro storm drain line enters the site boundary from the southeastern edge where the storm drain is located, and connects to a larger main that transects the site bearing north-south approximately 5 feet inside the western boundary of the site along Hesperian Boulevard. The approximate depths of these utility trenches are 24 to 36 inches for natural gas lines, 27 inches for the cable and phone lines, 62 to 75 inches for the EBMUD water lines, and 62 to 72 inches for the storm drain lines. An OLSD sewer utility trench map was also reviewed, however the map reviewed did not indicate connections for off-

site sewer mains onto the site. The approximate depths for the off-site mains for OLSD sewer utility trenches are 76 inches to 112 inches.

The utility trenches most likely to affect the migration of COC on- or off-site would be water, sanitary sewer, and stormwater trenches. These utility trenches are at least 5 feet bgs, and appear to recede in respect to grade toward the south or southwest. These trenches are most likely composed of permeable materials (sands and gravels) that would allow for easier migration of COCs. However, because these trenches are above the shallowest groundwater levels reported within the site vicinity (9 feet bgs at 15008 East 14th Street), it is unlikely these trenches would be exposed to COC impacted groundwater on-site or within the site vicinity.

The well survey data reviewed was obtained from ACPWA and the DWR, and was updated between 1984 and 1997. The data indicated that 44 cathodic, groundwater monitoring, irrigation, test, or destroyed wells were listed within the one-quarter mile search radius in 17 different locations. Of the 17 well locations, seven were listed downgradient or adjacent to the site. According to the data, of these seven well locations, the closest was approximately 200 feet south and adjacent to the site. This location is actually a group of monitoring wells which are related to a leaking underground storage tank case at 15008 Hesperian Boulevard. These wells appear to be used for groundwater monitoring only. Of the remaining six wells, one was reported as destroyed and five were reported as active. The five active wells were reported to be irrigation wells varying in total depth from 24 to 60 feet bgs. The closest irrigation well is listed at 1268 Betty Avenue, approximately 800 feet west of the site. Only one downgradient well had screening depth information. This well was located at 1052 Dillo Street, approximately 1,100 feet southwest of the site, and is screened between 24 to 56 feet bgs with a sanitary seal at 20 feet bgs. The deepest downgradient well is an irrigation well which has a reported depth of approximately 60 feet. If the irrigation wells are still active, they may draw potentially impacted groundwater from the site and surrounding properties.

7. LIMITATIONS

The environmental services described in this report have been conducted in general accordance with current regulatory guidelines and the standard-of-care exercised by environmental consultants performing similar work in the project area. No warranty, expressed or implied, is made regarding the professional opinions presented in this report. Please note that this study did not include an evaluation of geotechnical conditions or potential geologic hazards.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires any additional information or has questions regarding the content, interpretations presented, or completeness of this document.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions and the referenced literature. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of man at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

8. SELECTED REFERENCES

Alameda County Environmental Health Services, 2006, Letter to Ms. Diana Pagano regarding the subject Fuel Leak Case No. RO0002925, Quality Tune Up, 14901 East 14th Street, San Leandro, CA: dated October 6.

Hageman Aguiar, Inc., 1993, Report of Limited Soil Investigation: dated October 26.

Hageman Aguiar, Inc., 1996, Proposed Workplan for Additional Subsurface Investigation: dated November 4.

Hageman Aguiar, Inc., 1997, Report of Additional Subsurface Investigation: dated January 6.

Hageman Aguiar, Inc., 1997, Final Tank Closure Report: dated October 13.

Ninyo & Moore, 2004, Initial Site Assessment, 14901 East 14th Street: dated September 27.

Ninyo & Moore, 2005, Limited Phase 2 Environmental Site Assessment, Quality Tune Up, 14901 East 14th Street, San Leandro, California: dated June 6.

TABLE 1
SUMMARY OF REGIONAL ABANDONED, ACTIVE, AND DESTROYED WELLS
14901 EAST 14TH STREET, SAN LEANDRO, CALIFORNIA

Figure ID	Permit No.	State Well Number		Well Address	Well Owner	Latest Update	Drill Date	Well Elevation	Depth of Completed Well	Depth to First Water Level	Well Diameter (inches)	Screened Interval Depth	Sanitary Seal Depth	Well Type
		Township Range	Section											
1	NA	3S/2W	6B 5	153rd Avenue & East 14th Street	PG&E	01/18/85	6/73	0	120	0	0	NA	NA	CAT
2	NA	3S/2W	6C26	14994 East 14th Street	BP Oil Company	07/22/97	2/94	0	24	15	2	NA	NA	MON
	NA	3S/2W	6C27	14994 East 14th Street	BP Oil Company	07/22/97	2/94	0	23	15	2	NA	NA	MON
	95290/1	3S/2W	6C28	14994 East 14th Street	BP Oil Company	02/17/98	6/95	0	24	10	4	NA	NA	MON
	95290/1	3S/2W	6C29	14994 East 14th Street	BP Oil Company	02/17/98	6/95	0	24	14	2	NA	NA	MON
	95290/1	3S/2W	6C30	14994 East 14th Street	BP Oil Company	02/17/98	6/95	0	24	14	2	NA	NA	MON
	95290/1	3S/2W	6C31	14994 East 14th Street	BP Oil Company	02/17/98	6/95	0	24	10	4	NA	NA	MON
3	NA	3S/2W	6C 3	150th Avenue & East 14th Street	C & H DEVELOPMENT CO	06/20/88	03/01/88	0	19	11	2	9 to 19	7	MON
4	NA	3S/2W	6C 7	15002 Hesperian Boulevard	CHEVRON U.S.A. INC.	09/01/89	05/01/88	0	23	13	4	NA	NA	MON
	NA	3S/2W	6C 8	15002 Hesperian Boulevard	CHEVRON U.S.A. INC.	09/01/89	05/01/88	0	22	13	4	NA	NA	MON
	NA	3S/2W	6C 9	15002 Hesperian Boulevard	CHEVRON U.S.A. INC.	09/01/89	05/01/88	0	21	12	4	NA	NA	MON
	NA	3S/2W	6D 4	15002 Hesperian Boulevard	CHEVRON STATION #92013	12/14/88	05/01/88	0	23	14	4	NA	NA	MON
	NA	3S/2W	6D 5	15002 Hesperian Boulevard	CHEVRON STATION #92013	12/14/88	05/01/88	0	18	13	4	NA	NA	MON
	NA	3S/2W	6D 6	15002 Hesperian Boulevard	CHEVRON STATION #92013	12/14/88	05/01/88	0	17	12	4	NA	NA	MON
5	NA	3S/2W	6C 2	1479 151st Avenue	FREDIN	08/03/84	NA	28	25	0	10	NA	NA	IRR
6	NA	3S/2W	6C 1	1524 150th Avenue	STANLEY	08/03/84	NA	32	30	0	6	NA	NA	IRR
7	NA	3S/2W	6C10	15035 East 14th Street	Triequity	01/15/91	10/01/90	0	20	10	2	11 to 21	7	MON
	NA	3S/2W	6C11	15035 East 14th Street	Triequity	01/15/91	10/01/90	0	21	14	2	11 to 21	7	TES
	NA	3S/2W	6C12	15035 East 14th Street	Triequity	01/15/91	10/01/90	0	21	14	2	11 to 21	7	TES
8	NA	3S/2W	6C13	15008 East 14th Street	Unocal Corporation	NA	04/21/91	NA	20.5	13	2	7 to 19	3	MON
	NA	3S/2W	6C14	15008 East 14th Street	Unocal Corporation	NA	04/24/91	NA	19.5	13	2	7 to 19	3	MON
	NA	3S/2W	6C24	15008 East 14th Street	Unocal #3292 MW-10	07/29/93	8/92	0	20	14	2	8 to 20	4	MON
	NA	3S/2W	6C25	15008 East 14th Street	Unocal #3292 MW-11	07/29/93	8/92	0	20	14	2	7 to 19	3	MON
	NA	3S/2W	6C18	15008 East 14th Street	Unocal Corporation	06/16/93	8/92	0	20	14	2	8 to 20	4	MON
	NA	3S/2W	6C19	15008 East 14th Street	Unocal Corporation	06/16/93	8/92	0	20	14	2	7 to 19	3	MON
	NA	3S/2W	6C15	15008 East 14th Street	Unocal Corporation	07/29/91	4/91	37	22.5	12	2	7 to 22.5	3	MON
	NA	3S/2W	6C16	15008 East 14th Street	Unocal Corporation	07/29/91	4/91	37	20.5	12	2	7 to 19.5	3	MON
	NA	3S/2W	6C17	15008 East 14th Street	Unocal Corporation	07/29/91	4/91	37	23	12	2	7 to 22.5	3	MON
	NA	3S/2W	6C20	15008 East 14th Street	Unocal S/S #3292 MW6	06/17/93	5/92	0	20	11	2	8 to 20	4	MON
	NA	3S/2W	6C21	15008 East 14th Street	Unocal S/S #3292 MW7	06/17/93	5/92	0	22	11	2	11 to 21.5	8	MON
	NA	3S/2W	6C22	15008 East 14th Street	Unocal S/S #3292 MW8	06/17/93	5/92	0	20	12	2	8 to 19	4	MON
	NA	3S/2W	6C23	15008 East 14th Street	Unocal S/S #3292 MW9	06/17/93	5/92	0	19	11	2	8 to 19	4	MON
9	NA	3S/2W	6D 3	1268 Betty Avenue	FRANK MIQUEL	08/03/84	5/77	0	32	0	0	NA	NA	IRR
10	NA	3S/2W	6D 2	14830 East 14th Street	M.F. NUNES	08/03/84	NA	0	100	0	8	NA	NA	IRR
11	NA	3S/2W	6D	15051 Hesperian Boulevard	RALPH H. GOODELL	10/29/86	10/01/86	0	0	0	0	NA	12	DES
12	NA	3S/2W	6D 1	1252 Dorothy Avenue	ROBERTS	08/03/84	NA	38	24	0	6	NA	NA	IRR
13	NA	3S/2W	6E 1	988 Dillo Street	R.M. ADAMS	08/03/84	NA	32	40	0	6	NA	NA	IRR
14	NA	3S/2W	6E 6	1052 Dillo Street	WM. DENNIS	08/03/84	11/01/77	0	60	17	8	24 to 56	20	IRR
15	NA	3S/3W	1A 6	14982 Western Avenue	EDMUND BOTELITO	08/13/84	1/78	0	30	0	6	NA	NA	IRR
16	96854	2S/2W	31N 2	14883 East 14th Street	Federighi & Company	12/26/97	12/01/96	0	20	12	2	NA	NA	MON
	96854	2S/2W	31N 3	14883 East 14th Street	Federighi & Company	12/26/97	12/01/96	0	20	11	2	NA	NA	MON
	96854	2S/2W	31N 4	14883 East 14th Street	Federighi & Company	12/26/97	12/01/96	0	20	10	2	NA	NA	MON
	96854	2S/2W	31N 5	14883 East 14th Street	Federighi & Company	12/26/97	12/01/96	0	20	10	8	NA	NA	MON
17	NA	2S/2W	31N1	14852 Towers Street	Carl C. McElroy	NA	NA	NA	40	20	6	20 to 40	10	IRR

NOTES:
NA = Not applicable, information not provided or unknown.
CAT = Cathodic Well, MON = Groundwater Monitoring Well, IRR = Irrigation Well, TES = Testing Well, DES = Destroyed Well
All depths are measured in feet

REFERENCE: 2004 THOMAS GUIDE FOR ALAMEDA AND CONTRA COSTA COUNTIES, STREET GUIDE AND DIRECTORY.

NORTH

0 1900 3800

APPROXIMATE SCALE IN FEET

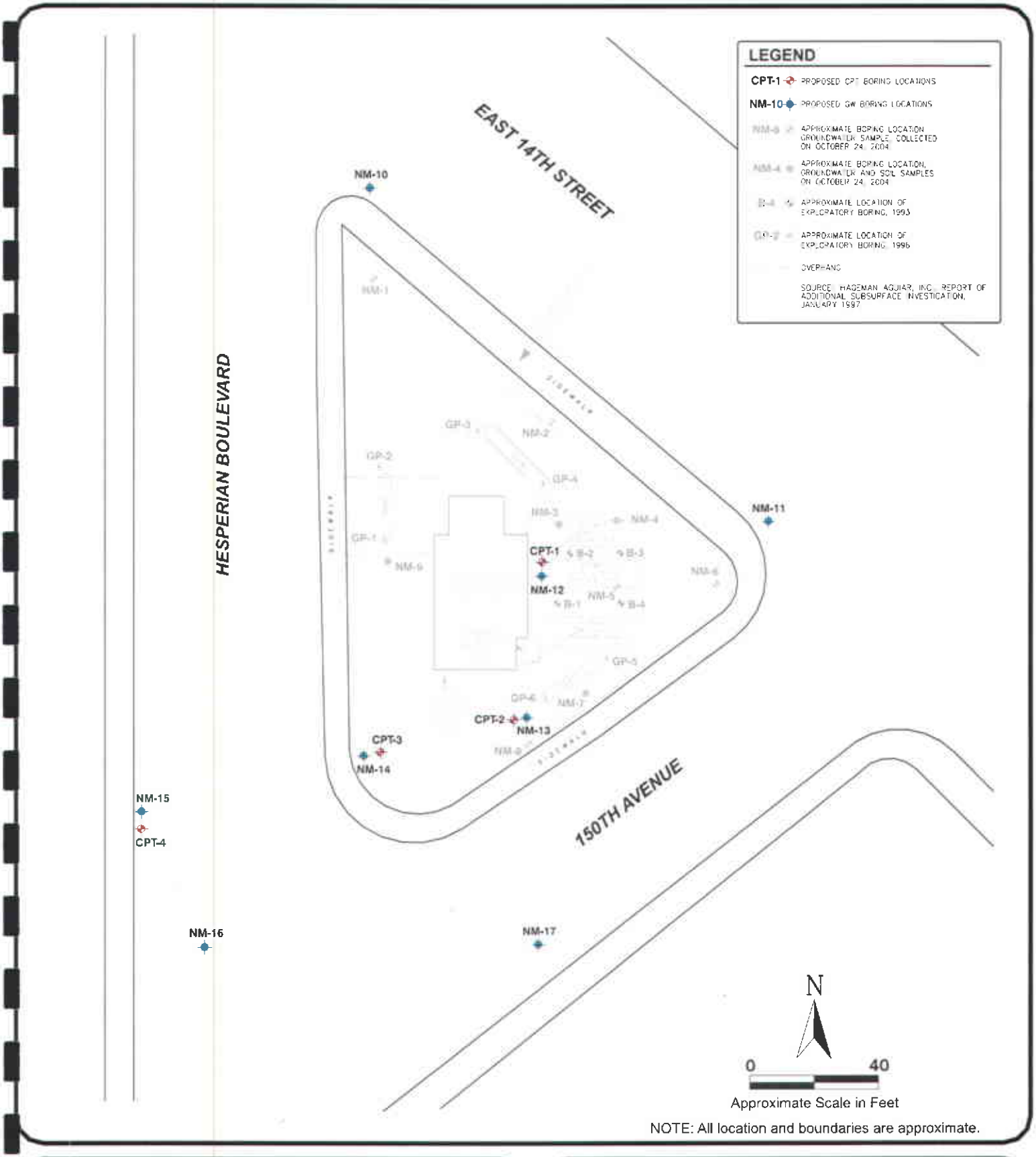
Ninyo & Moore

401007-A4.DWG

SITE LOCATION MAP

QUALITY TUNE UP
14901 E. 14th STREET
SAN LEANDRO, CALIFORNIA

PROJECT NO.	DATE	FIGURE
401007003	1/2007	1



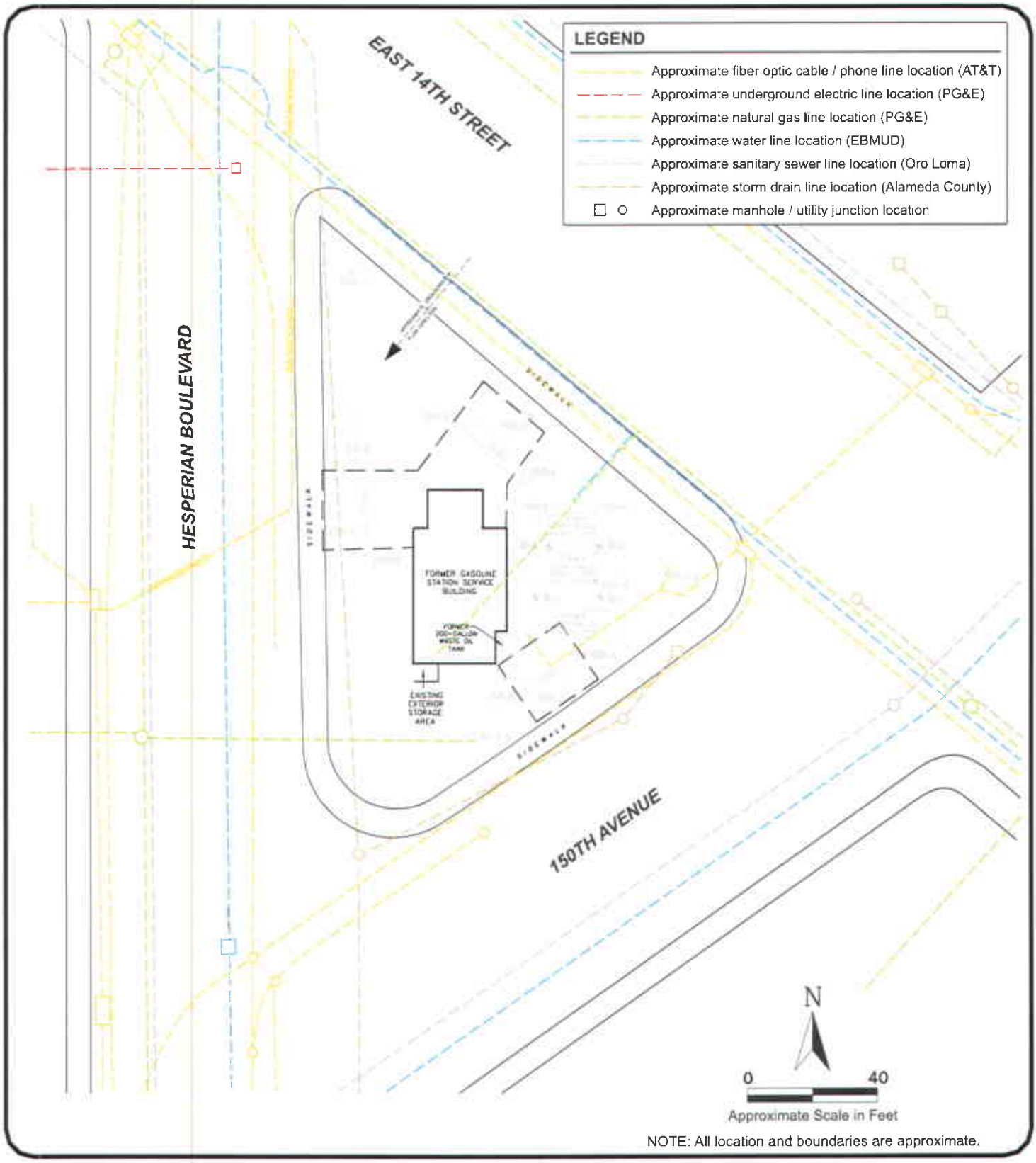
NOTE: All location and boundaries are approximate.

Ninyo & Moore

PROPOSED BORING LOCATION MAP

QUALITY TUNE UP
14901 EAST 14TH STREET
SAN LEANDRO, CALIFORNIA

PROJECT NO.	DATE	FIGURE
401007003	01/07	2



NOTE: All location and boundaries are approximate.

Ninyo & Moore

UNDERGROUND UTILITY TRENCH LOCATION MAP

QUALITY TUNE UP
14901 EAST 14TH STREET
SAN LEANDRO, CALIFORNIA

PROJECT NO.	DATE	FIGURE
401007003	01/07	3

LEGEND

17 ○ Approximate Well Location

N

0 500

Approximate Scale in Feet

NOTE: All location and boundaries are approximate.
Aerial photo supplied from TerraMetrics, 2006.

Ninyo & Moore

HISTORICAL OFF SITE WELL LOCATION MAP

QUALITY TUNE UP
14901 EAST 14TH STREET
SAN LEANDRO, CALIFORNIA

PROJECT NO.	DATE	FIGURE
401007003	01/07	4

APPENDIX A

REGULATORY AGENCY DOCUMENTATION

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

October 6, 2006

Ms. Diana Pagano
6912 Broadway Terrace
Oakland, CA 94611-1924

Subject: Fuel Leak Case No. RO0002925, Quality Tune Up, 14901 East 14th Street, San Leandro, CA

Dear Ms. Pagano:

Alameda County Environmental Health Department (ACEH) staff has reviewed the reports titled, "Limited Phase II Environmental Site Assessment", and "Groundwater Monitoring Well Installation Work Plan" dated June 6, 2005 and November 18, 2005 and prepared on your behalf by Ninyo & Moore. Groundwater sampling conducted in June 2005 confirms the presence of dissolved petroleum hydrocarbon contamination in groundwater beneath the subject site. Grab groundwater samples tested up to 20,000 µg/L TPHg, 60,000 µg/L TPHd, <10 µg/L benzene and 5 µg/L MtBE, respectively. Soil boring NM-8 located downgradient of the former fuel dispenser island tested concentration up to 20,000 µg/L TPHg in groundwater. In addition, groundwater sampling conducted in December 1996 tested up to 210,000 µg/L TPHg and 200 µg/L benzene in the vicinity of the former fuel dispensers, indicating that an unauthorized release may have occurred on site.

Evaluation of groundwater elevation data at nearby UST sites indicates the hydraulic gradient in the vicinity of your site trends toward the southeast. ACEH is concerned that residual petroleum hydrocarbon contamination may be migrating off site toward the southeast, in the direction of 150th street. Furthermore, our review of the case file indicates that no offsite soil and groundwater characterization to delineate the extent of petroleum hydrocarbon contamination downgradient of the subject site has been completed. Consequently, prior to the installation of monitoring wells, ACEH requests that you provide a work plan detailing your proposal to characterize groundwater conditions downgradient of your site.

Based on ACEH staff review of the case file, we request that you address the following technical comments and prepare a work plan detailing work to be performed, and send us the reports described below. Please provide 72-hour advance written notification to this office (e-mail preferred to steven.plunkett@acgov.org) prior to the start of field activities.

TECHNICAL COMMENTS

1. **Contamination Plume Delineation.** The purpose of contaminant plume definition is to determine the three-dimensional extent of contamination (MTBE, petroleum products, and associated blending compounds and additives) in soil and groundwater from the unauthorized release at your site.

   The three-dimensional extent of contamination in soil and groundwater at your site is undefined. The results of recent groundwater monitoring indicate the presence of elevated levels of dissolved phase petroleum products at your site.

Results from the most recent onsite soil and groundwater investigation conducted in June 2005 demonstrate that dissolved TPHg and TPHd in groundwater beneath your site may be migrating off site. There has been no soil or groundwater sampling downgradient of soil borings NM-7 or NM-8 to determine the lateral extent of hydrocarbon contamination. To determine the extent of dissolved petroleum hydrocarbon contamination an additional soil and groundwater investigation is required downgradient of your site. Please discuss in detail your plans to determine the extent of dissolved petroleum hydrocarbon contamination downgradient of your site in the work plan requested below.

2. **Groundwater Contaminant Plume Monitoring**. The purpose of groundwater contaminant plume monitoring is to determine the three-dimensional movement of the plume, the rate of plume growth, and the effectiveness of cleanup activities.

   Once the extent of the plume is defined, we request that you install permanent monitoring wells and/or monitoring well clusters (screened at appropriate discrete depths with appropriate length of screen) and piezometers to monitor the three-dimensional movement of the plume. We request that you use detailed cross-sections, structural contours, isopachs, and rose diagrams for groundwater gradient to determine the appropriate locations and designs for monitoring wells/well clusters and piezometers that are needed to appropriately monitor the three-dimensional movement of the plume. To accurately evaluate your site, your monitoring wells/well clusters will need to be screened in the permeable zones with screen lengths that match the stratigraphic sequence. Generally, these screened intervals will not be greater than 10 feet in length. The number of piezometer/wells should be sufficient to evaluate all permeable zones. Include your proposal for the installation of wells/piezometers in the work plan requested below. We recommend that you submit your proposal for the installation of monitoring wells/well clusters and piezometers to ACEH for comment prior to installation. Report on the installation of wells/piezometers in the Soil and Groundwater Investigation Report (SWI) requested below.

3. **Proposed Monitoring Well Locations and Installation**. It appears the monitoring well locations as proposed in the monitoring well work plan are based on a hydraulic gradient that may not represent the actual groundwater gradient at the site. Review of groundwater elevation data at nearby UST sites indicates that the hydraulic gradient is toward the southeast. ACEH believes the proposed monitoring well network -in its current design- may be insufficient to adequately define the extent of contamination downgradient of soil borings NM-7 and NM-8. To determine the extent of dissolved petroleum hydrocarbon contamination an additional soil and groundwater investigation is required downgradient of your site, prior to the installation of groundwater monitoring wells.

   ACEH suggests the use of monitoring wells designed with sand pack intervals of 2'-5' or less, as these wells will likely be representative of depth discrete groundwater conditions. Upon completion of the monitoring well installation ACEH request that you submit all well construction details, technical specifications and well litoholgic logs in the report requested below. In addition, we request that a licensed professional surveyor survey the monitoring well location. Please present your rational for well design and monitoring well locations in the SWI report requested below.

4. **Soil and Groundwater Sample Analysis**. All soil and groundwater samples collected during the SWI are to be analyzed for TPHg and TPHd by EPA Method 8015M or 8260, BTEX,

EDB, EDC, MtBE, TAME, ETBE, DIPE, TBA and EtOH by EPA Method 8260 and total lead. Please present the results from the soil and groundwater sampling in the SWI report requested below.

5. **Groundwater Monitoring.** We request that you monitor the groundwater contaminant plumes on a quarterly basis. Additional wells may be required to define the downgradient extent of the plume if it continues to migrate. ACEH requires that all monitoring wells be included in a groundwater-monitoring program. We request that Quarterly Reports contain all of the following: a discussion of the results of your plume monitoring, an evaluation of the stability of your plume and recommendations for the installation of additional wells if your evaluation indicates your plume is migrating, regular progress reports on the work at your site, inform the District of any problems with the work at your site, and a description of any additional work that may be needed.The groundwater samples are to be analyzed for TPHg and TPHd by EPA Method 8015M or 8260, BTEX, EDB, EDC, MtBE, TAME, ETBE, DIPE, TBA and EtOH by EPA Method 8260. Please present the results for the quarterly monitoring in the Quarterly Monitoring Reports requested below.

6. **Preferential Pathway Study**

The purpose of the preferential pathway study is to locate potential migration pathways and conduits and determine the probability of the NAPL and/or plume encountering preferential pathways or conduits that could spread contamination. Of particular concern is the identification of abandoned wells and improperly destroyed wells that can act as vertical conduits to deeper water gearing zones, pumping wells in the vicinity of your site and manmade conduits for shallow migration.

We request that you perform a preferential pathway study that details the potential migration pathways and potential conduits (wells, utilities, pipelines, etc.) for horizontal and vertical migration that may be present in the vicinity of the site. Discuss your analysis and interpretation of the results of the preferential pathway study (including the detailed well survey and utility survey requested below) and report your results in the Well Installation Report requested below. Include an evaluation of the probability of the dissolved phase and NAPL plumes for all constituents of concern encountering preferential pathways and conduits that could spread the contamination, particularly in the vertical direction to deeper aquifers. The results of your study shall contain all information required by 23 CCR, Section 2654(b).

a) **Utility Survey**

An evaluation of all utility lines and trenches (including sewers, storm drains, pipelines, trench backfill, etc.) within and near the site and plume area(s) is required as part of your study. Submittal of map(s) and cross-sections showing the location and depth of all utility lines and trenches within and near the site and plume area(s) is required as part of your study.

b) **Well Survey**

The preferential pathway study shall include a detailed well survey of all wells (monitoring and production wells: active, inactive, standby decommissioned (sealed with concrete), abandoned, (improperly decommissioned or lost); and dewatering and

cathodic protection wells) within a ~~½~~ 1/4 mile radius of the subject site. The well survey should include well data from California Department of Water Resource well database and Alameda County Department of Public Works. As part of your detailed well survey, please perform a background study of the historical land uses of the site and properties in the vicinity of the site. Use the results of your background study to determine the existence or unrecorded/unknown (abandoned) wells, which can act as pathways for migration of contamination at and/or from your site. ~~Please review historical maps such as Sanborn maps, aerial photos, etc., when performing the background study. Submittal of map(s) showing the location of all wells identified in your study, and the use of tables to report the data collected as part of your survey are required. Include appropriate photographic prints, in stereo pairs, of historic aerial photos used as part of the study. We also request that you list by date all aerial photographs available for the site from the aerial survey company of library you use during your study~~. Please refer to the Regional Board's guidance for identification, location, and evaluation of potential deep well conduits when conducting your preferential pathway study. Present the result from the preferential pathway study in the report requested below.

per KML conversation w/ steven plunkett

TECHNICAL REPORT REQUEST

Please submit technical reports to Alameda County Environmental Health (Attention: Mr. Steven Plunkett), according to the following schedule:

- ~~**November 30, 2006**~~ January 19, 2007 – Soil and Groundwater Investigation Work Plan and Preferential Pathway Study Off-Site Investigation Report
- **February 30, 2007** – ~~1st Quarter 2007 Groundwater Monitoring Report~~
- ~~**May 30, 2007** – 2nd Quarter 2007 Groundwater Monitoring Report~~
- ~~**August 30, 2007** – 3rd Quarter 2007 Groundwater Monitoring Report~~
- ~~**November 30, 2007** – 4th Quarter 2007 Groundwater Monitoring Report~~
- ~~**90 Days After Completion of Soil and Groundwater Investigation** – Soil and Groundwater Investigation Report~~

April 2007 - GW monitoring well installation WP
~~May~~ June, 2007 - GW Monitoring well installation

These reports are being requested pursuant to California Health and Safety Code Section 25296.10. 23 CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from a petroleum UST system, and require your compliance with this request.

ELECTRONIC SUBMITTAL OF REPORTS

The Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of all reports in electronic form to the county's ftp site. Paper copies of reports will no longer be accepted. The electronic copy replaces the paper copy and will be used for all public information requests, regulatory review, and compliance/enforcement activities. Instructions for submission of electronic documents to the Alameda County Environmental Cleanup Oversight Program ftp site are provided on the attached "Electronic Report Upload (ftp) Instructions." Please do not submit reports as attachments to electronic mail.

Submission of reports to the Alameda County ftp site is an addition to existing requirements for electronic submittal of information to the State Water Resources Control Board (SWRCB) Geotracker website. Submission of reports to the Geotracker website does not fulfill the requirement to submit documents to the Alameda County ftp site. In September 2004, the SWRCB adopted regulations that require electronic submittal of information for groundwater cleanup programs. For several years, responsible parties for cleanup of leaks from underground storage tanks (USTs) have been required to submit groundwater analytical data, surveyed locations of monitor wells, and other data to the Geotracker database over the Internet. Beginning July 1, 2005, electronic submittal of a complete copy of all necessary reports was required in Geotracker (in PDF format). Please visit the SWRCB website for more information on these requirements (http://www.swrcb.ca.gov/ust/cleanup/electronic_reporting).

PERJURY STATEMENT

All work plans, technical reports, or technical documents submitted to ACEH must be accompanied by a cover letter from the responsible party that states, at a minimum, the following: "I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge." This letter must be signed by an officer or legally authorized representative of your company. Please include a cover letter satisfying these requirements with all future reports and technical documents submitted for this fuel leak case.

PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

The California Business and Professions Code (Sections 6735, 6835, and 7835.1) requires that work plans and technical or implementation reports containing geologic or engineering evaluations and/or judgments be performed under the direction of an appropriately registered or certified professional. For your submittal to be considered a valid technical report, you are to present site specific data, data interpretations, and recommendations prepared by an appropriately licensed professional and include the professional registration stamp, signature, and statement of professional certification. Please ensure all that all technical reports submitted for this fuel leak case meet this requirement.

UNDERGROUND STORAGE TANK CLEANUP FUND

Please note that delays in investigation, later reports, or enforcement actions may result in your becoming ineligible to receive grant money from the state's Underground Storage Tank Cleanup Fund (Senate Bill 2004) to reimburse you for the cost of cleanup.

AGENCY OVERSIGHT

If it appears as though significant delays are occurring or reports are not submitted as requested, we will consider referring your case to the Regional Board or other appropriate agency, including the County District Attorney, for possible enforcement actions. California Health and Safety Code, Section 25299.76 authorizes enforcement including administrative action or monetary penalties of up to $10,000 per day for each day of violation.

Should you have any questions, do not hesitate to call me at (510) 383-1767.

Sincerely,

Steven Plunkett
Hazardous Materials Specialist

Enclosure: ACEH Electronic Report Upload (ftp) Instructions

Cc: Toyin Fawehinmi
City of San Leandro Engineering and Transportation Department
Civic Center, 835 East 14th Street
San Leandro, CA 94577

Karl Busche
City of San Leandro Environmental Service Division
Civic Center, 835 East 14th Street
San Leandro, CA 94577

Donna Drogos, ACEH
Steven Plunkett, ACEH
File

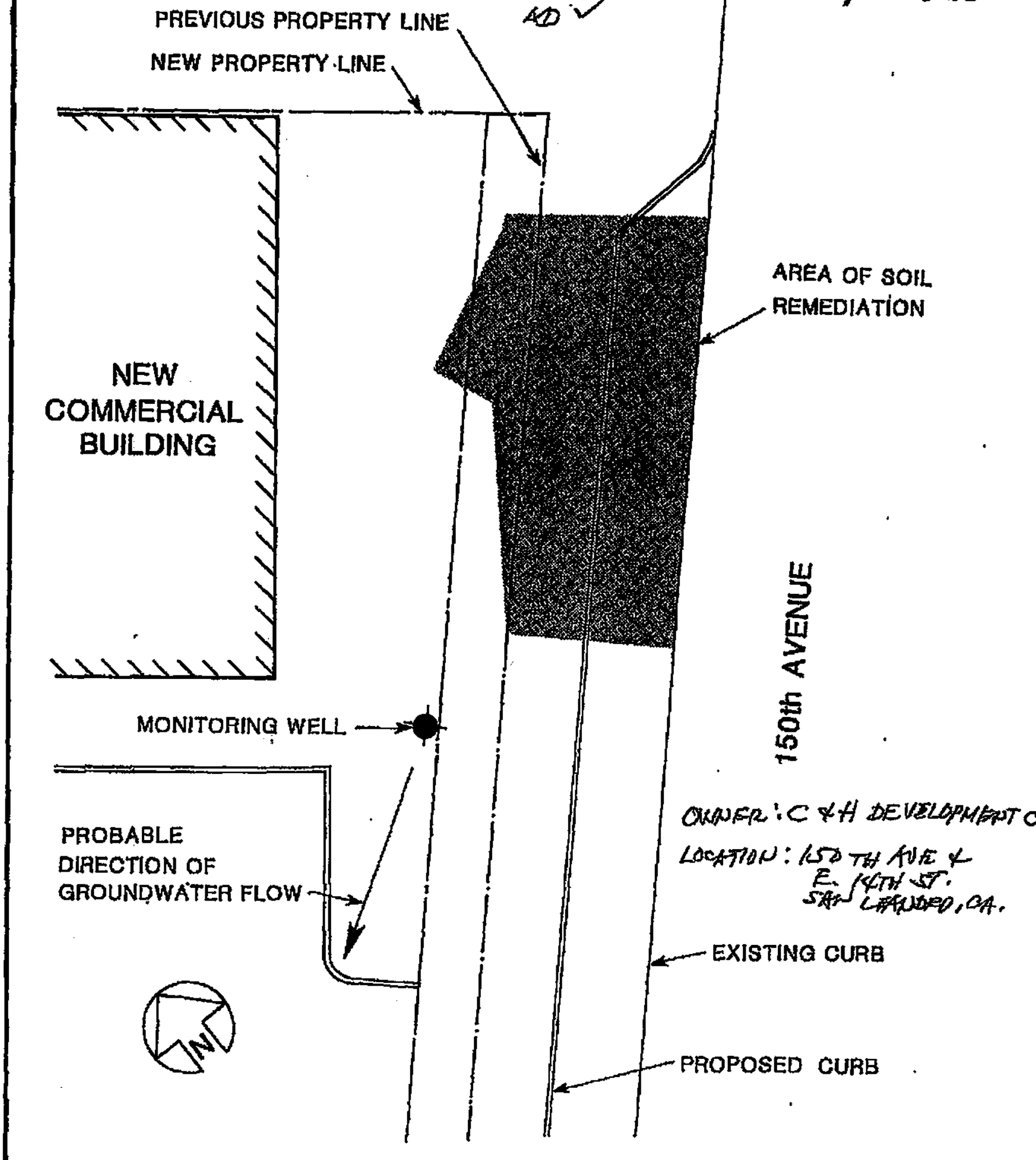
APPENDIX B

WELL DRILLERS REPORTS AND BORING LOGS

01-351 permit 88071 pb/gpd

3S/2W6C3

INV. ✓
AD ✓



OWNER: C & H DEVELOPMENT CO.
LOCATION: 150TH AVE & E. 14TH ST. SAN LEANDRO, CA.

MONITORING WELL LOCATION

Subsurface Consultants

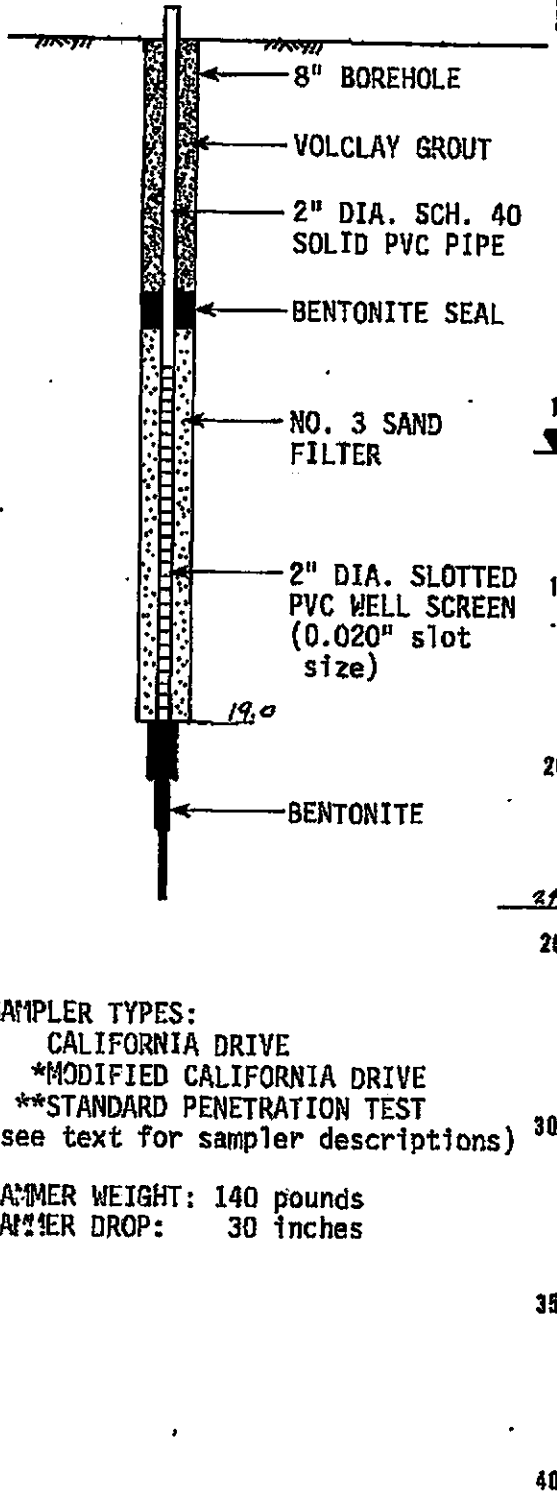
150th AVE. & E.14th ST.-SAN LEANDRO, CA			PLATE
JOB NUMBER 209.006	DATE 4/26/88	APPROVED [signature]	1

DRILLER: JOHN CARVER DRILLING CO.

#88071 01-351 3S/2W6C3 Alameda

LOG OF TEST BORING 1

EQUIPMENT 8" Hollow Stem Auger
DATE DRILLED 3/31/88
ELEVATION --



DEPTH (FT)	SAMPLE	BLOWS PER FOOT	
0			BROWN SILTY CLAY (CL) stiff, moist, contains numerous rock fragments
		18	
			BLACK SILTY CLAY (CL) stiff, moist
5		18	OLIVE-BROWN SANDY CLAYEY SILT(ML) stiff, moist, contains occasional rock fragments
			MOTTLED OLIVE-BROWN SILTY CLAY (CL) medium stiff, moist
10		13	GROUNDWATER LEVEL 1 HOUR AFTER DRILLING
		10	OLIVE-GREEN SILTY CLAY (CL) medium stiff, wet
15			
			increase in sand content
20		*15	
		19	DARK BROWN SILTY CLAY (CL) stiff, wet
24		**13	
25			
30			
35			
40			

SAMPLER TYPES:
CALIFORNIA DRIVE
*MODIFIED CALIFORNIA DRIVE
**STANDARD PENETRATION TEST
(see text for sampler descriptions)

HAMMER WEIGHT: 140 pounds
HAMMER DROP: 30 inches

Subsurface Consultants

150th AVE. & E.14th ST.-SAN LEANDRO, CA

JOB NUMBER	DATE	APPROVED
209.006	4/21/88	

PLATE 2

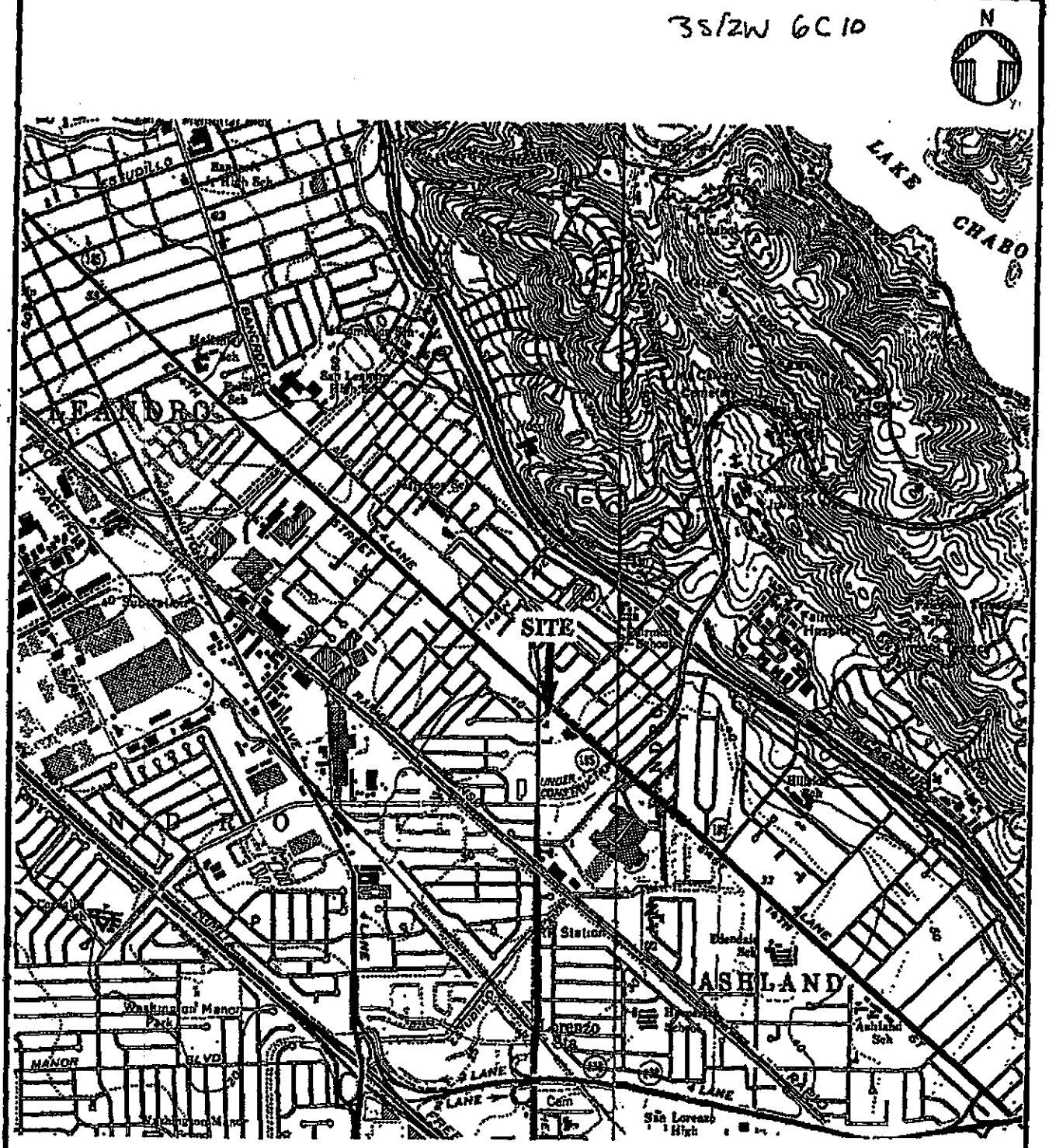
CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

365655

3S/2W 6C 10



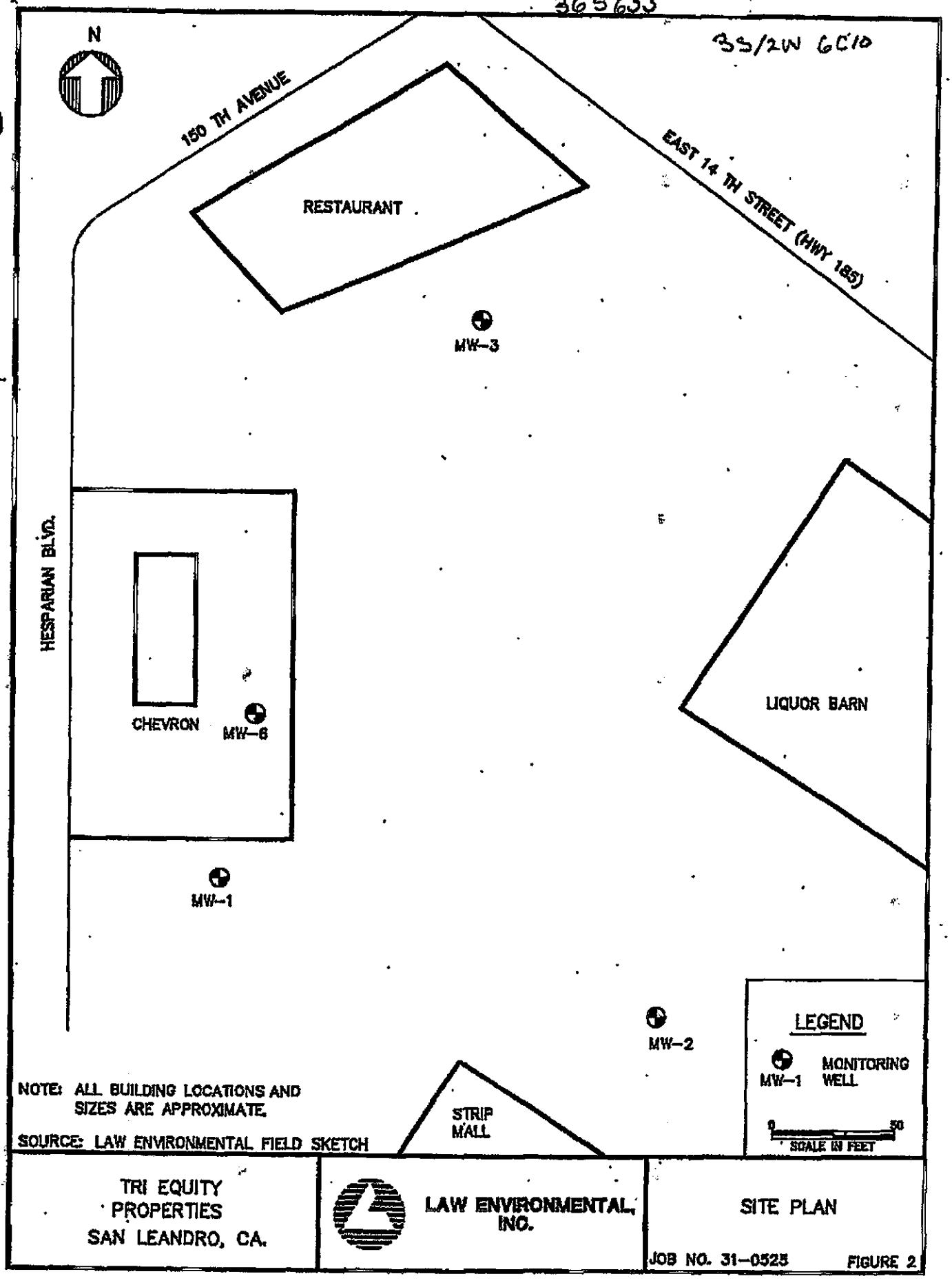
SOURCE: U.S.G.S. TOPOGRAPHIC MAP
SAN LEANDRO, CALIFORNIA
(1959, PHOTOREVISED 1980)

0 2000
SCALE IN FEET

TRI EQUITY PROPERTIES SAN LEANDRO, CA.	LAW ENVIRONMENTAL, INC.	SITE LOCATION MAP 15035 E. 14TH STREET JOB NO. 31--0525 FIGURE 1

365655

3S/2W 6C10



NOTE: ALL BUILDING LOCATIONS AND SIZES ARE APPROXIMATE.

SOURCE: LAW ENVIRONMENTAL FIELD SKETCH

TRI EQUITY PROPERTIES SAN LEANDRO, CA.	LAW ENVIRONMENTAL, INC.	SITE PLAN
		JOB NO. 31-0525 FIGURE 2

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WELL COMPLETION REPORT
(WELL LOGS)

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365656

3S/2W 6C11

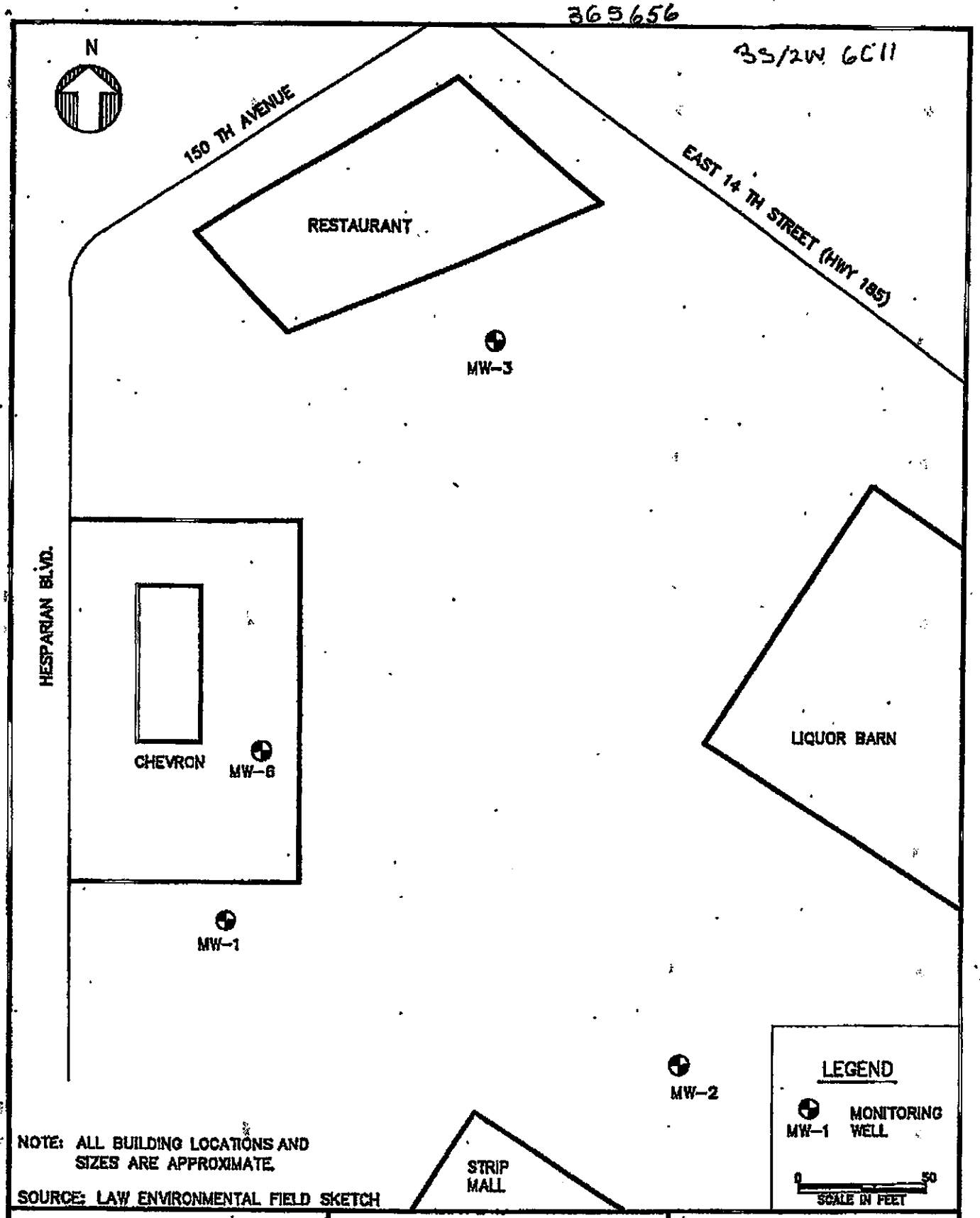
SOURCE: U.S.G.S. TOPOGRAPHIC MAP
SAN LEANDRO, CALIFORNIA
(1959, PHOTOREVISED 1980)

0 2000
SCALE IN FEET

TRI EQUITY PROPERTIES SAN LEANDRO, CA.	LAW ENVIRONMENTAL, INC.	SITE LOCATION MAP 15035 E. 14TH STREET JOB NO. 31-0525 FIGURE 1

365656

3S/2W 6C11



NOTE: ALL BUILDING LOCATIONS AND SIZES ARE APPROXIMATE.

SOURCE: LAW ENVIRONMENTAL FIELD SKETCH

TRI EQUITY PROPERTIES SAN LEANDRO, CA.	LAW ENVIRONMENTAL, INC.	SITE PLAN
		JOB NO. 31-0525 FIGURE 2

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WELL COMPLETION REPORT
(WELL LOGS)

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365657

3S/2W 6C12

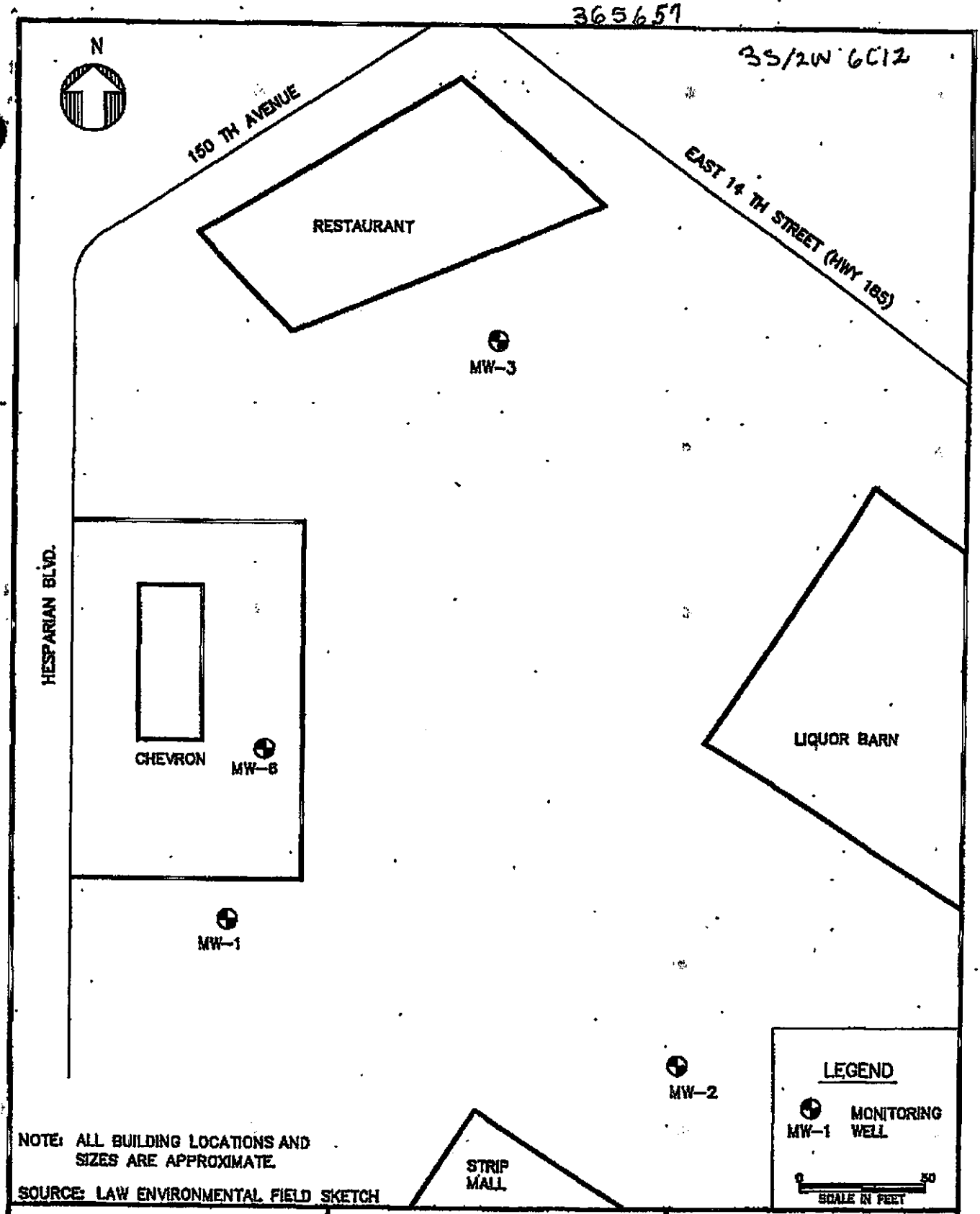
SOURCE: U.S.G.S. TOPOGRAPHIC MAP
SAN LEANDRO, CALIFORNIA
(1959, PHOTOREVISED 1980)

0 2000
SCALE IN FEET

TRI EQUITY PROPERTIES SAN LEANDRO, CA.	LAW ENVIRONMENTAL, INC.	SITE LOCATION MAP 15035 E. 14TH STREET JOB NO. 31-0525 FIGURE 1

365651

3S/2W 6C12



NOTE: ALL BUILDING LOCATIONS AND SIZES ARE APPROXIMATE.

SOURCE: LAW ENVIRONMENTAL FIELD SKETCH

TRI EQUITY PROPERTIES SAN LEANDRO, CA.	LAW ENVIRONMENTAL, INC.	SITE PLAN
		JOB NO. 31-0525 FIGURE 2

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(WELL LOGS)

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3S/2W 6C13

308354A

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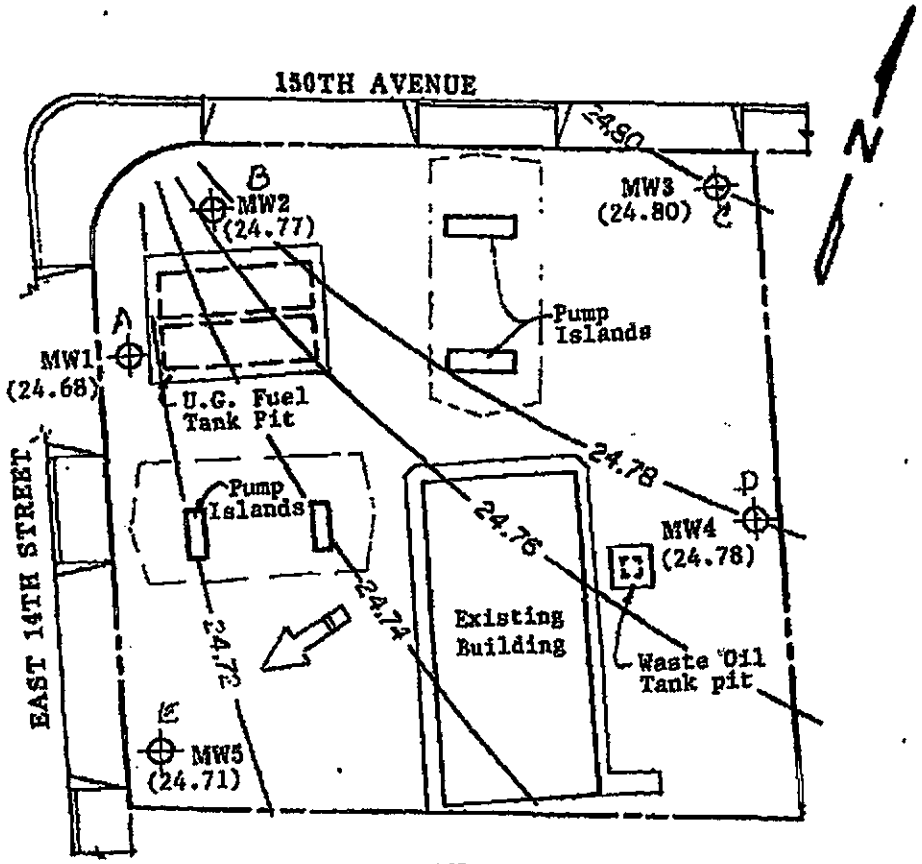
(707) 746-6915 • (707) 746-6916 • FAX: (707) 746-5581



SITE PLAN
Figure 1

0 30 60
Approx. scale feet

LEGEND

- Monitoring well
- ( ) Ground water table elevation in feet above Mean Sea Level on 5/4/91
- Direction of ground water flow
- Contours of ground water table elevation in feet above Mean Sea Level

Unocal S/S #3292
15008 E. 14th Street
San Leandro, CA

35/2W 6C13

BORING LOG

308354A

Project No. KEI-P91-0102	**Boring & Casing Diameter** 9" 2"	**Logged By** W.W.
Project Name Unocal 15008 E. 14th San L	**Well Cover Elevation**	**Date Drilled** 4/24/91
Boring No. MW1	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		Asphalt pavement over sand and gravel. Fill material consisting of gravelly clay with sand and silt, gravel to 4" diameter, moist, stiff, brown.
			ML/ MH	Clayey silt, with fine-grained sand, trace gravel to 1/2" diaemter, trace caliche, very stiff, moist, very dark grayish brown.
6/11/12		5		
			CL/ CH	Clay, withsilt, root holes common, a 2" sandy clay lens observed at 9-1/2', moist, stiff, olive to olive gray.
4/5/6		10		
5/6/9	▽			Clay, trace silt, sand and caliche, root holes common, moist to very moist, light olive brown and dark yellowish brown.
				Clay, as above, sheen present, firm, gray and olive brown mottled.
3/2/4		15		
			MH	Silt, saturated, sheen present, firm, dark greenish gray.
			CL/ CH	Clay, trace sand and caliche, porous, moist, stiff, gray and brown mottled.
6/7/9		20		Clayey silt, trace sand, very moist, stiff to very stiff, olive gray.
			MH	TOTAL DEPTH: 20.5'

3S/2W 6C13
308354A

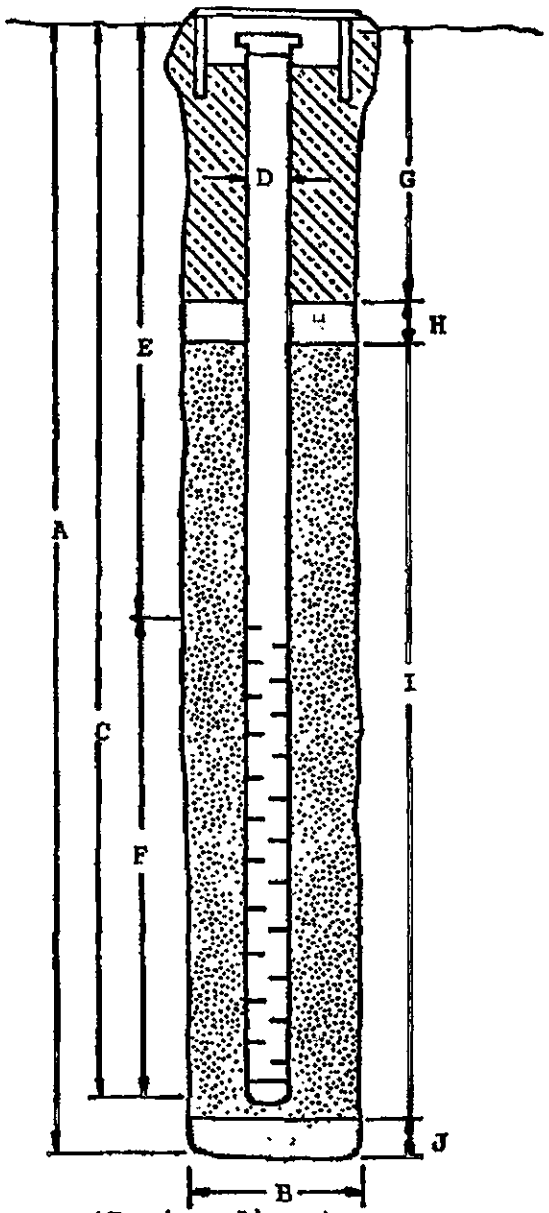
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal 15008 E. 14th San Leandro BORING/WELL NO. MW1

PROJECT NUMBER: KEI-P91-0102

WELL PERMIT NO.:

Flush-mounted Well Cover



A. Total Depth: 20.5'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 19'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375" ID = 2.067"

E. Depth to Perforations: 7'

F. Perforated Length: 12'

Perforation Type: Machined Slot

Perforation Size: 0.010"

G. Surface Seal: 3'

Seal Material: Concrete

H. Seal: 2'

Seal Material: Bentonite

I. Gravel Pack: 14'

Pack Material: RMC Lonestar Sand

Size: #2/16

J. Bottom Seal: 1.5'

Seal Material: Bentonite

*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

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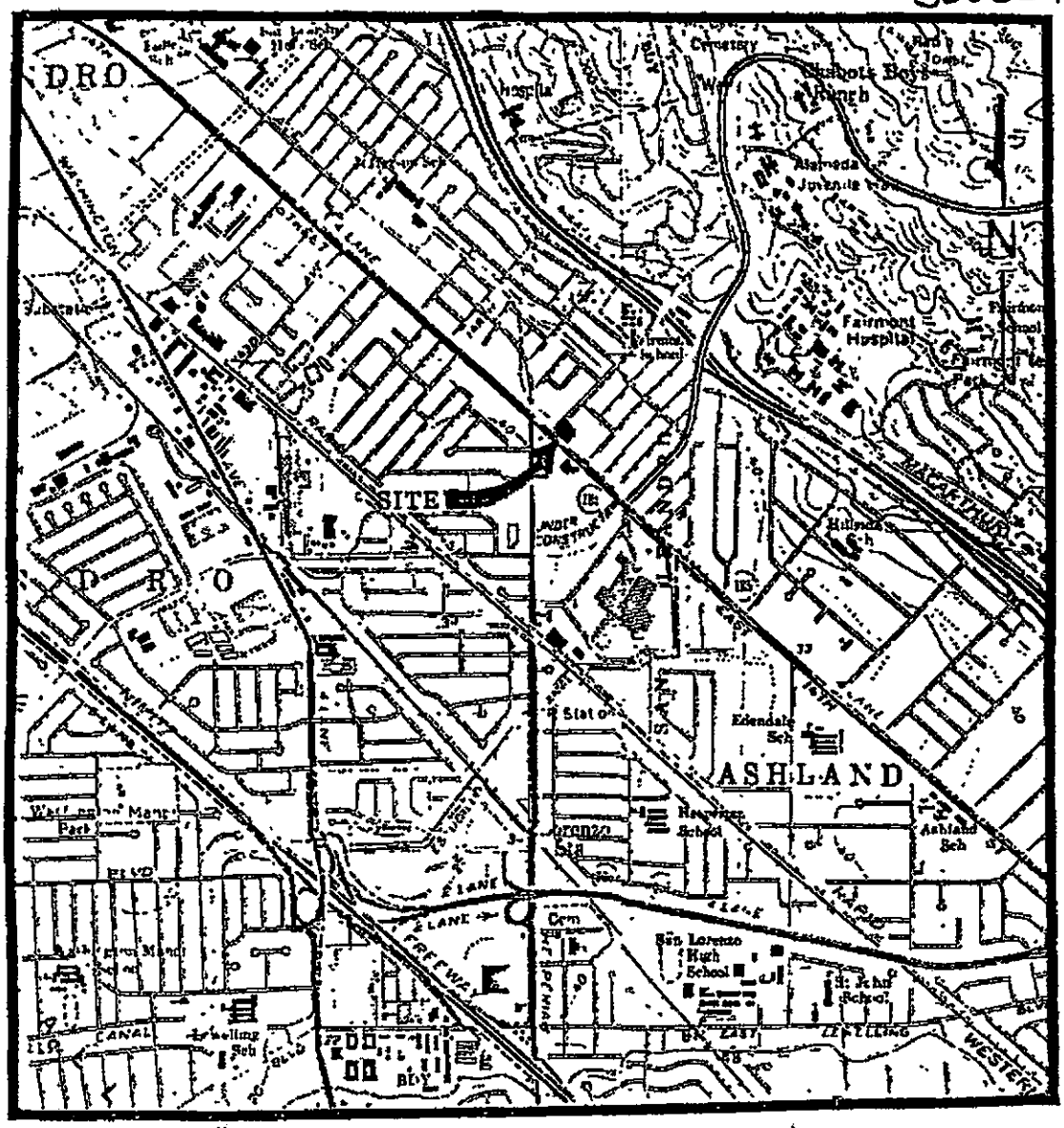
35/2W 6C13-17

308354 A-6



LOCATION MAP

Base modified from U.S.G.S. 7.5 minute Hayward Quadrangle (photorevised 1980) and San Leandro Quadrangle (photorevised 1980)

Unocal S/S #3292
15008 E. 14th Street
San Leandro, CA

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WELL COMPLETION REPORT
(WELL LOGS)

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3S/2W 6C14

308354B-8

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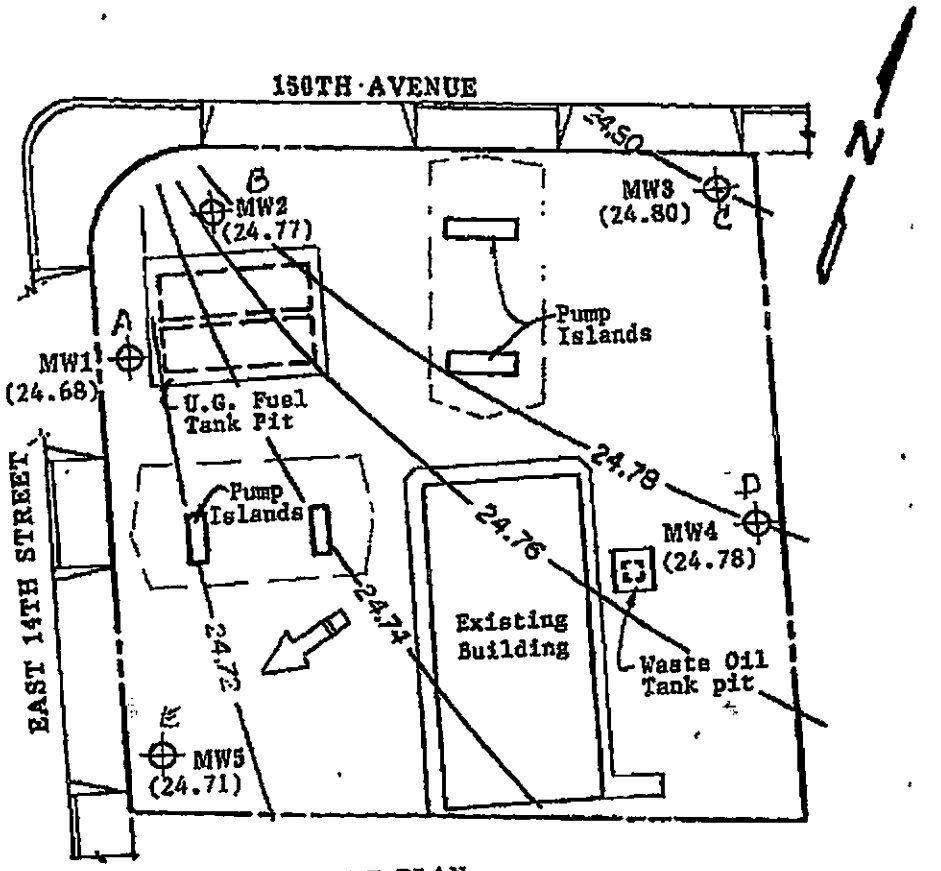


SITE PLAN
Figure 1

LEGEND

- ⊕ Monitoring well
- ( ) Ground water table elevation in feet above Mean Sea Level on 5/4/91
- ⇨ Direction of ground water flow
- —— Contours of ground water table elevation in feet above Mean Sea Level

Unocal S/S #3292
15008 E. 14th Street
San Leandro, CA

3S/2W 6C 14

BORING LOG

3083548

Project No. KEI-P91-0102	**Boring & Casing Diameter** 9" 2"	**Logged By** W.W.
Project Name Unocal 15008 E. 14th San L	**Well Cover Elevation**	**Date Drilled** 4/24/91
Boring No. MW2	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		Asphalt pavement over sand and gravel. Fill material consisting of gravelly clay with silt, with cobbles to 12" diameter, moist, stiff, gray to greenish gray.
			CH	Silty clay, trace sand, moist, stiff, black.
3/4/5		5	ML/MH	Clayey silt with fine-grained sand, trace caliche, moist, stiff, dark brown to very dark grayish brown.
				Clayey silt, trace fine-grained sand, porous, moist, stiff, olive gray.
4/5/6		10	CL	Clay, with silt, trace fine-grained sand, trace caliche, gray staining around roots, moist, olive brown mottled with dark grayish brown.
3/4/5	▽			Silty clay, saturated, trace caliche nodules to 3/8" diameter, stiff, olive brown and olive gray mottled with gray staining.
3/4/6		15		Silty clay, as above, olive gray and dark yellowish brown.
			MH	Clayey silt, trace caliche, saturated, free product present, stiff, olive gray and dark yellowish brown.
4/5/8			CL/CH	Clay, trace very fine sand, trace caliche, porous, very moist, stiff, dark gray and very dark grayish brown mottled.
		20		TOTAL DEPTH: 19.5'

3S/2W 6C14

3083548

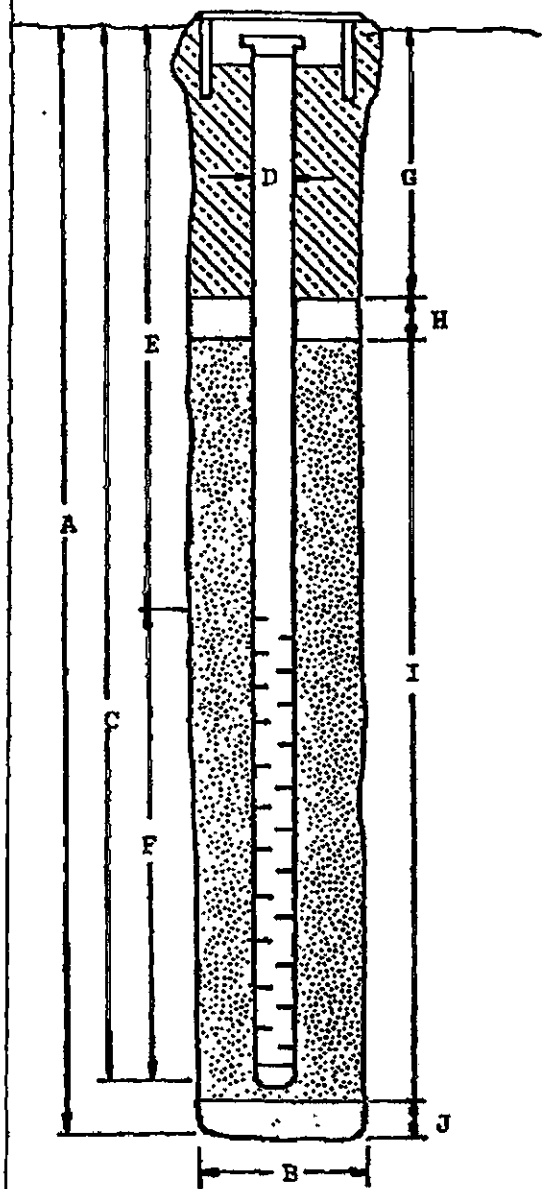
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal 15008 E. 14th San Leandro BORING/WELL NO. MW2

PROJECT NUMBER: KEI-P91-0102

WELL PERMIT NO.:

Flush-mounted Well Cover



A. Total Depth: 19.5'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 19.5'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 7'

F. Perforated Length:

Perforation Type: Machined Slot

Perforation Size: 0.010"

G. Surface Seal: 3'

Seal Material: Concrete

H. Seal: 2'

Seal Material: Bentonite

I. Gravel Pack: 14.5'

Pack Material: RMC Lonestar Sand

Size: #2/16

J. Bottom Seal: None

Seal Material: N/A

*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

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WELL COMPLETION REPORT
(WELL LOGS)

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3S/2W 6C15

3083540

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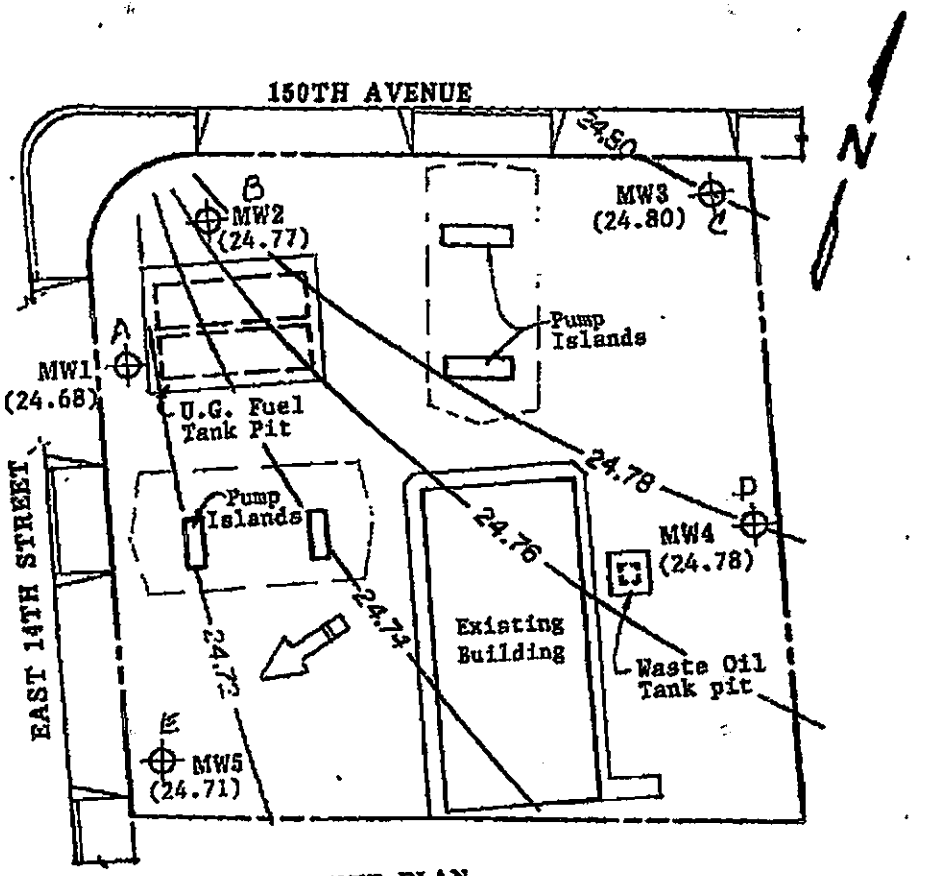


SITE PLAN
Figure 1

LEGEND

- Monitoring well
- ( ) Ground water table elevation in feet above Mean Sea Level on 5/4/91
- Direction of ground water flow
- Contours of ground water table elevation in feet above Mean Sea Level

Unocal S/S #3292
15008 E. 14th Street
San Leandro, CA

3S/2W 6C15

BORING LOG

3083540

Project No. KEI-P91-0102	**Boring & Casing Diameter** 9" 2"	**Logged By** W.W.
Project Name Unocal 15008 E. 14th San L	**Well Cover Elevation**	**Date Drilled** 4/23/91
Boring No. MW3	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (feet) Samples	Stratigraphy USCS	Description
		0		Asphalt pavement over sand and gravel. Fill material consisting of gravelly clay with silt, trace sand, gravel to 3-1/2" diameter, firm, dark brown.
			CL/ CH	Silty clay, trace sand, firm, very dark gray.
7/9/13		5	ML	Clayey silt, trace gap graded sand, trace gravel to 1/2" diameter, moist, very stiff, dark gray to dark greenish gray.
			ML/ MH to CL/ CH	Clayey silt to silty clay, porous, caliche common, stiff, greenish gray.
4/4/5		10		Clayey silt to silty clay, trace fine-grained sand, very moist, porous, trace caliche, firm greenish gray.
2/3/2	▽		SC	Clayey sand, trace gravel to 1/2" dia. saturated, loose, greenish gray.
		15	ML/ MH	Clayey silt, trace sand, very moist to saturated, firm, greenish gray.
4/6/7			CL/ CH	Clay, with fine-grained sand, trace silt, caliche common, porous, very moist, dark gray and dark greenish gray.
		20		

25/3W 6C15

BORING LOG

308354C

Project No. KEI-P91-0102	**Boring & Casing Diameter** 9" 2"	**Logged By** W.W.
Project Name Unocal 15008 E. 14th San L	**Well Cover Elevation**	**Date Drilled** 4/23/91
Boring No. MW3	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
6/8/11			CL/ CH	Clay, trace fine-grained sand, trace caliche, porous, moist, very stiff, very dark gray.
		25		
		30		
		35		
		40		TOTAL DEPTH: 22.5'

25/3W 6C15

308354C

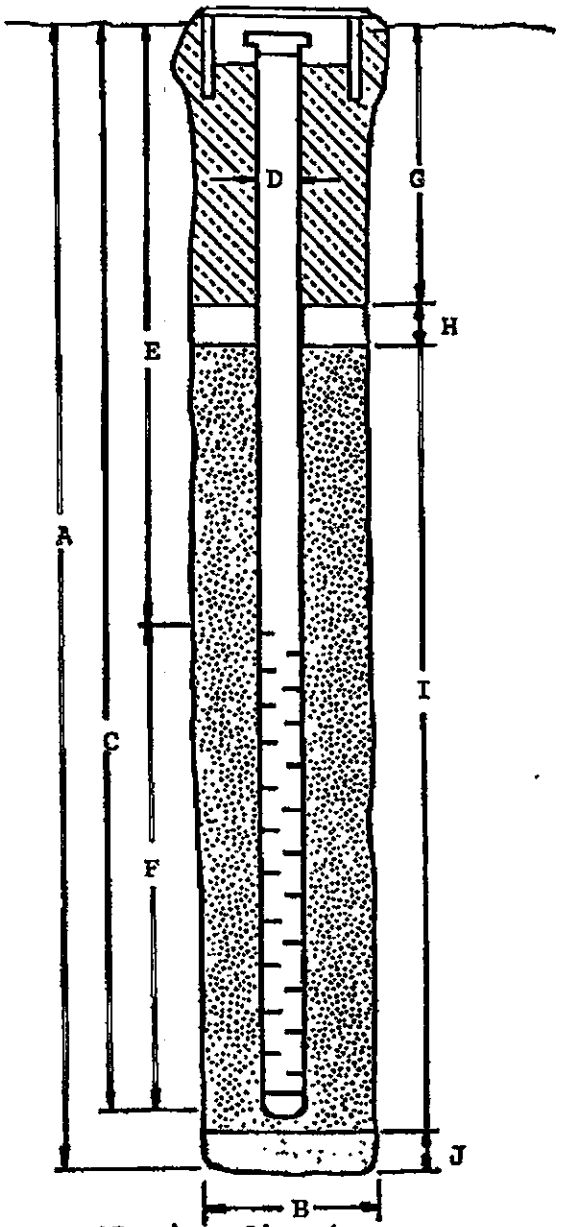
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal 15008 E. 14th San Leandro BORING/WELL NO. MW3

PROJECT NUMBER: KEI-P91-0102

WELL PERMIT NO.:

Flush-mounted Well Cover



A. Total Depth: 22.5'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 22.5'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 7'

F. Perforated Length: 15.5'

Perforation Type: Machined Slot

Perforation Size: 0.010"

G. Surface Seal: 3'

Seal Material: Concrete

H. Seal: 2'

Seal Material: Bentonite

I. Gravel Pack: 17.5'

Pack Material: RMC Lonestar Sand

Size: #2/16

J. Bottom Seal: None

Seal Material: N/A

*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

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(WELL LOGS)

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35/2W 6C16

308354D

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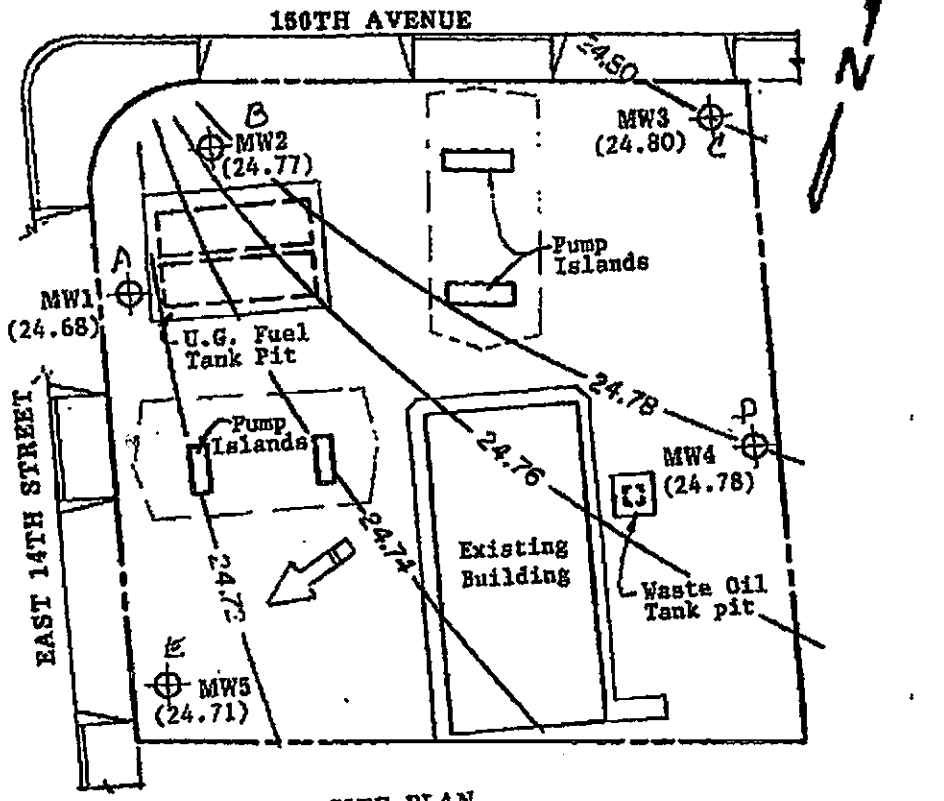


SITE PLAN
Figure 1

LEGEND

- Monitoring well
- ( ) Ground water table elevation in feet above Mean Sea Level on 5/4/91
- Direction of ground water flow
- Contours of ground water table elevation in feet above Mean Sea Level

Unocal S/S #3292
15008 E. 14th Street
San Leandro, CA

25/3W 6C16

BORING LOG

308354D

Project No. KEI-P91-0102	**Boring & Casing Diameter** 9" 2"	**Logged By** W.W.
Project Name Unocal 15008 E. 14th San L	**Well Cover Elevation**	**Date Drilled** 4/23/91
Boring No. MW4	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		Asphalt pavement over sand and gravel. Fill material consisting of gravelly clay with silt and sand, gravel to 3-1/2" diameter, moist, firm, brown.
			CH	Silty clay, with fine-grained sand, porous, moist, stiff to very stiff, very dark gray.
7/9/7		5		
			ML/ MH	Clayey silt, with fine-grained sand, porous, trace angular gravel to 1/2" diameter, moist, stiff, dark brown.
				Sandy silt, trace clay, trace organic matter, very moist to saturated, stiff, brown to light olive brown.
4/5/7		10		
			CL/ CH	Clay, trace sand and silt, porous, caliche common, moist, stiff, brown and light olive brown mottled.
				Clay, as above, except greenish gray.
3/5/6	▽		SC	Clayey sand with gravel to 1/2" diameter, saturated, medium dense, greenish gray.
		15	ML/ MH	Clayey silt, trace fine-grained sand, porous, very moist to saturated, stiff, light olive gray.
			CL/ CH	Clay, trace silt, trace fine-grained sand, saturated, stiff, moist, very dark gray.
3/6/8		20	MH	Clayey silt, trace sand and caliche, very moist, stiff, greenish gray.
				TOTAL DEPTH: 20.5'

2S/3W 0C16

3083540

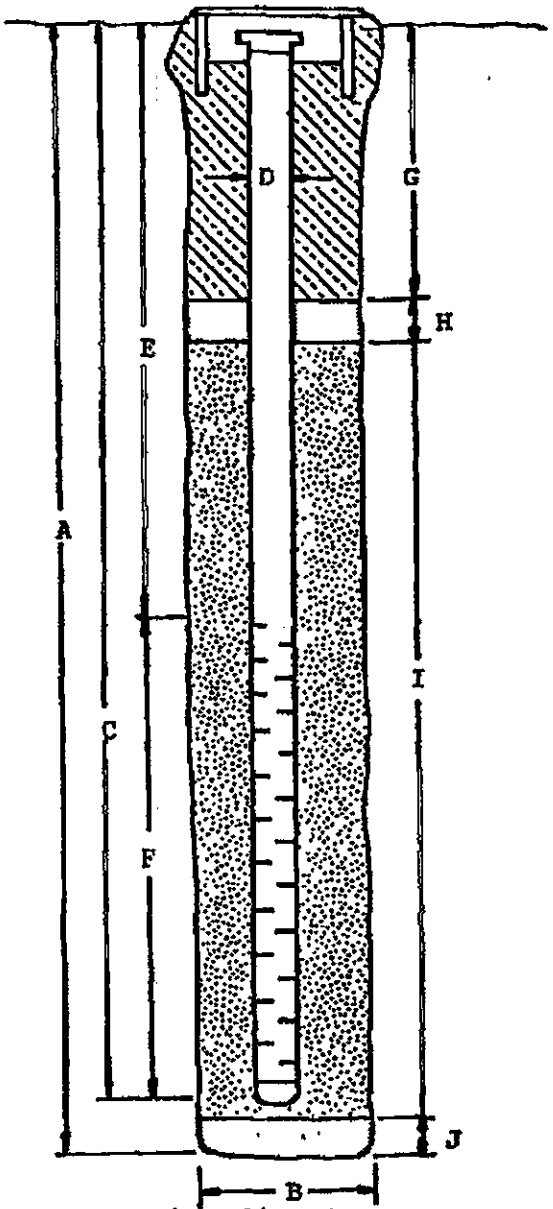
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal 15008 E. 14th San Leandro BORING/WELL NO. MW4

PROJECT NUMBER: KEI-P91-0102

WELL PERMIT NO.:

Flush-mounted Well Cover



A. Total Depth: 20.5'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 19.5'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 7'

F. Perforated Length: 12.5'

Perforation Type: Machined Slot

Perforation Size: 0.010"

G. Surface Seal: 3'

Seal Material: Concrete

H. Seal: 2'

Seal Material: Bentonite

I. Gravel Pack: 15.5'

Pack Material: RMC Lonestar Sand

Size: #2/16

J. Bottom Seal: None

Seal Material: N/A

*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

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WELL COMPLETION REPORT
(WELL LOGS)

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35/2W 6C1

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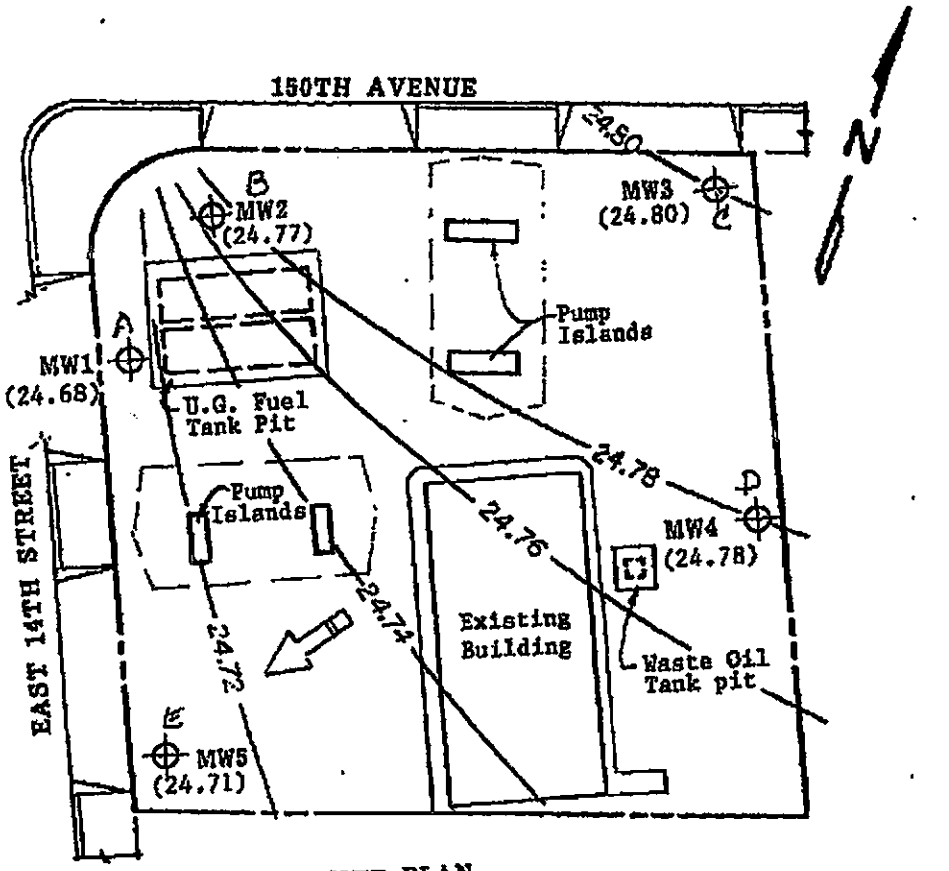


SITE PLAN
Figure 1

0 30 60
Approx. scale feet

LEGEND

- Monitoring well
- ( ) Ground water table elevation in feet above Mean Sea Level on 5/4/91
- Direction of ground water flow
- Contours of ground water table elevation in feet above Mean Sea Level

Unocal S/S #3292
15008 E. 14th Street
San Leandro, CA

2S/3W 6C 17

BORING LOG

308354E

Project No. KEI-P91-0102	**Boring & Casing Diameter** 9" 2"	**Logged By** W.W.
Project Name Unocal 15008 E. 14th San L	**Well Cover Elevation**	**Date Drilled** 4/23/91
Boring No. MW5	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		Asphalt pavement over sand and gravel. Fill material consisting of gravelly clay with silt, trace sand, moist, gravel to 3" diameter, firm, dark brown.
			CL/CH	Silty clay, trace sand, moist, firm, trace rootlets, very dark gray.
7/9/13		5	ML/MH	Clayey silt, trace sand and trace gravel to 1/2" diameter, moist, very stiff, brown with slight mottling of yellowish brown.
			CL/CH	Clay, with silt, trace sand, porous, caliche nodules to 3/8" diameter, moist, olive gray.
4/4/5		10		
	▽		ML/MH to CL/CH	Clayey silt to silty clay, pores locally contain free product, very moist to saturated, firm, olive gray to greenish gray.
2/2/3	initially ▽	15		
			CL/CH	Silty clay, trace sand, very moist to saturated, porous, trace caliche, stiff, dark gray to olive gray to 20-1/4 feet.
4/5/		20		

2S/3W 6C17

BORING LOG

308354E

Project No. KEI-P91-0102	Boring & Casing Diameter 9" 2"	Logged By W.W.
Project Name Unocal 15008 E. 14th San L	Well Cover Elevation	Date Drilled 4/23/91
Boring No. MW5	Drilling Method Hollow-stem Auger	Drilling Company EGI

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
/7 6/6/11		25 30 35 40	CL/ CH	Clay, trace very fine-grained sand, slightly moist, trace caliche, very stiff, very dark gray with slight dark greenish gray mottling.
				TOTAL DEPTH:-22.5'

2S/3W 6C-17

308354E

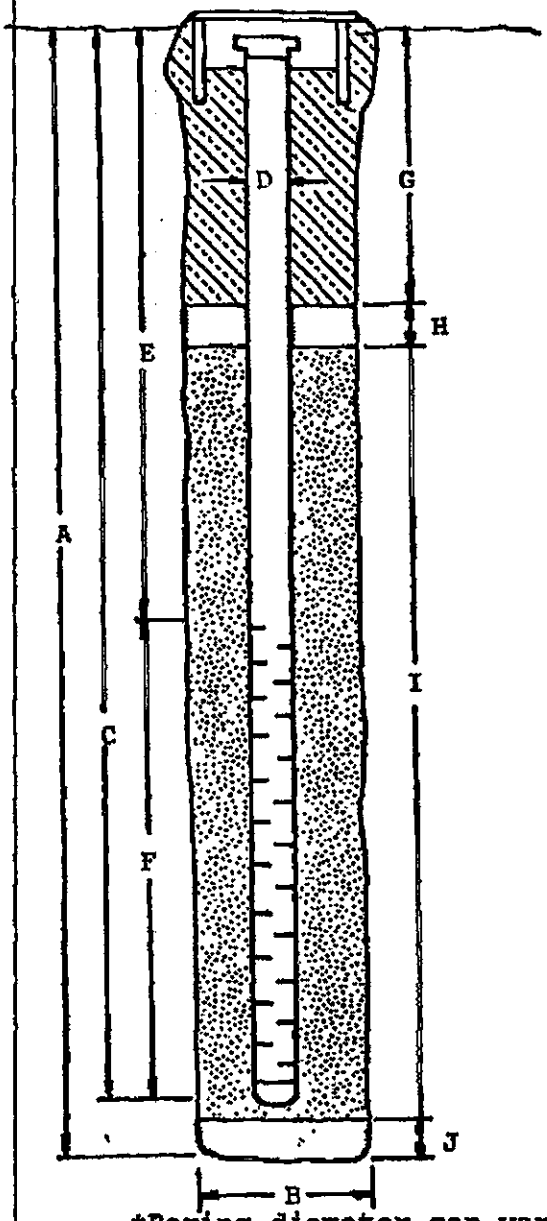
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal 15008 E. 14th San Leandro BORING/WELL NO. MW5

PROJECT NUMBER: KEI-P91-0102

WELL PERMIT NO.:

Flush-mounted Well Cover



A. Total Depth: 22.5'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 22.5'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 7'

F. Perforated Length: 15.5'

Perforation Type: Machined Slot

Perforation Size: 0.010"

G. Surface Seal: 3'

Seal Material: Concrete

H. Seal: 2'

Seal Material: Bentonite

I. Gravel Pack: 17.5'

Pack Material: RMC Lonestar Sand

Size: #2/16

J. Bottom Seal: None

Seal Material: N/A

*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

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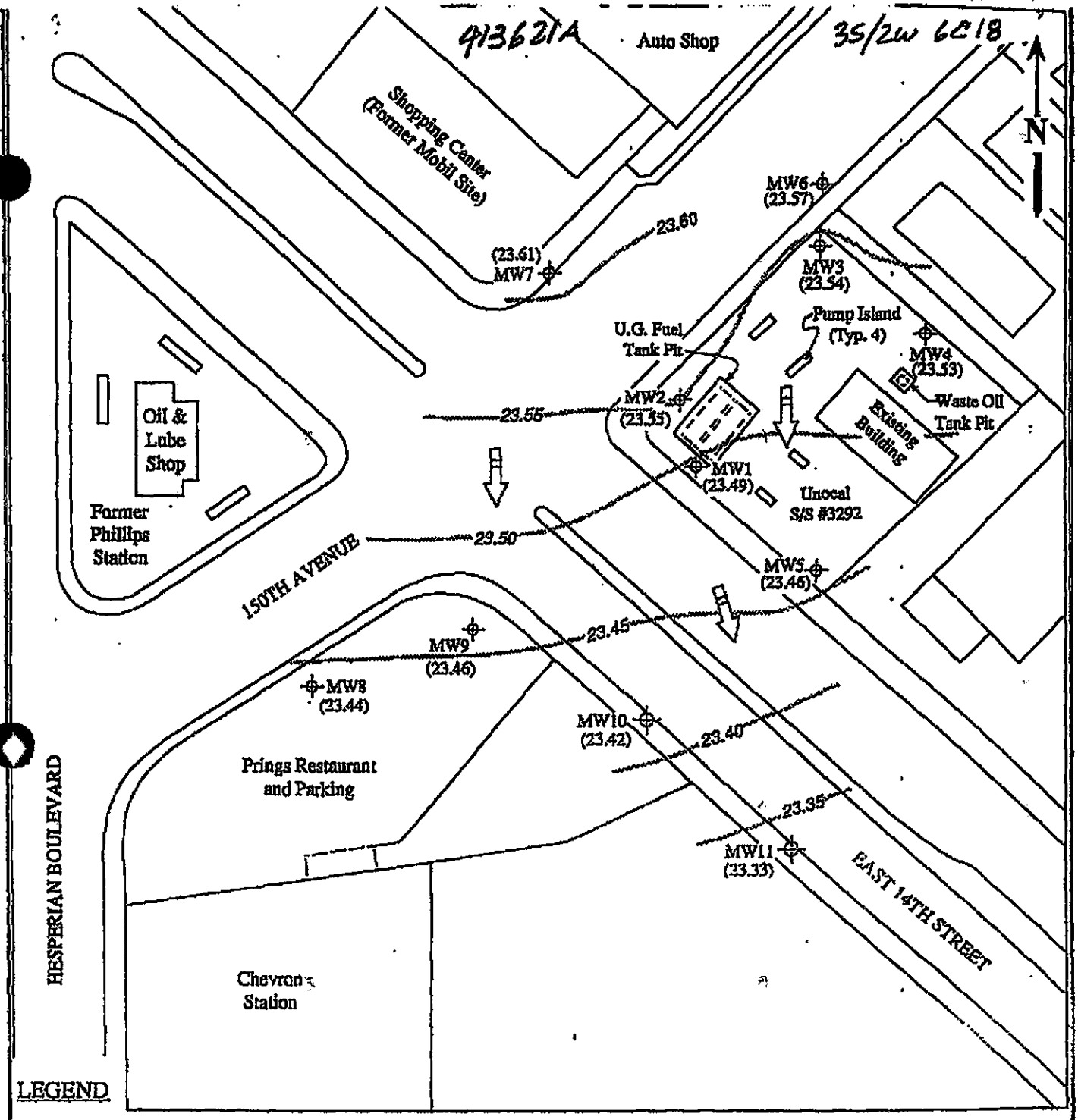
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED



POTENTIOMETRIC SURFACE MAP FOR AUGUST 20, 1992 MONITORING EVENT.

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION #3292
15008 E. 14TH STREET
SAN LEANDRO, CA

FIGURE 1

3S/2W 6C18

413621A

BORING LOG

Project No. KEI-P91-0102	**Boring Diameter** 9" **Casing Diameter** 2"	**Logged By** JGG **D.L.** CEG 1633
Project Name Unocal S/S #3292 15008 E. 14th, San Leandro	**Well Cover Elevation**	**Date Drilled** 8/13/92
Boring No. MW10	**Drilling Method** Hollow-stem Auger	**Drilling Company** Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
NO BLOW COUNT DATA - SAMPLES PUSHED	▽	0		Concrete slab.
				Sand and gravel mixed with black silty clay (fill and disturbed native soil).
			SC	Silty clay with trace sand and gravel, very stiff, moist, very dark brown (10YR 2/1) and black (10YR 1/1), mottled.
		5		Clayey sand with trace gravel to 3/4 inch in diameter, sand is fine to coarse-grained, medium dense, moist, dark brown (10YR 3/3), with iron-oxide stained root holes.
			ML	Silt with trace fine-grained sand, stiff, moist, dark greenish gray (5GY 4/1).
		10	CL	Silty clay, stiff, moist, dark gray (5Y 4/1), olive brown (2.5YR 4/4) below 10.5 feet with dark greenish gray (5GY 4/1) discolored root holes.
			MH	Clayey silt, stiff, moist, olive gray (5Y 4/2).
			CL	Silty clay, as at 11 feet.
			MH	Clayey silt, stiff, moist, olive gray (5Y 4/2).
			SM	Silty sand with trace clay, sand is fine-grained, medium dense, wet, dark greenish gray (5GY 4/1).
			CH	Silty clay, stiff, moist, olive gray (5Y 4/2) and very dark grayish brown (10YR 3/2), mottled.
		15	ML	Silt and sandy silt, stiff, very moist to wet, dark greenish gray (5Y 4/1), sand is very fine to fine-grained.
			CH	Silty clay, stiff, moist, olive gray (5Y 4/1) with minor iron oxide staining.
				Clay with silt and trace sand, stiff, moist, very dark brown (10YR 2/2) and very dark gray (10YR 3/1), mottled, minor caliche.
		20		TOTAL DEPTH 20'

35/2W 4C18
413621A

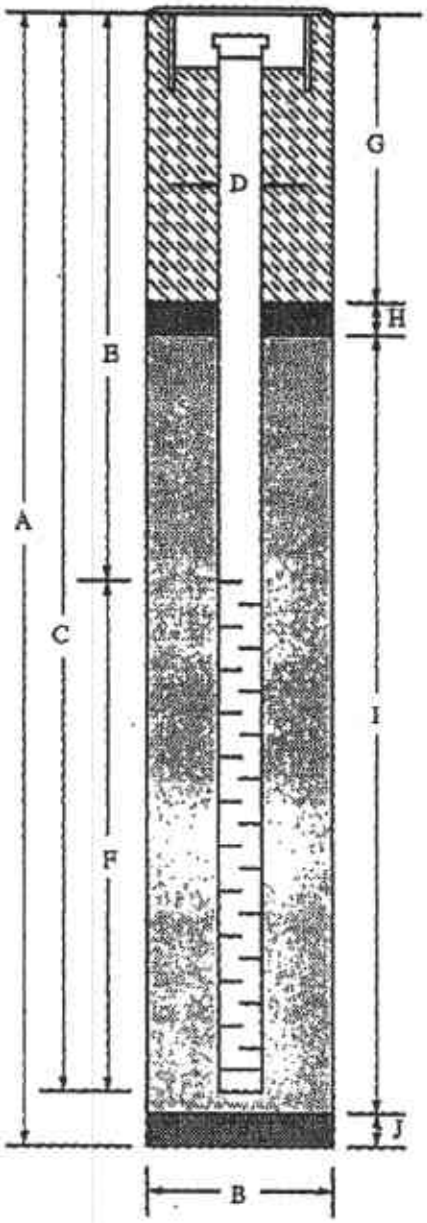
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal S/S #3292, 15008 E. 14th, San Leandro WELL NO. MW10

PROJECT NUMBER: KEI-P91-0102

WELL PERMIT NO.:

Flush-mounted Well Cover



A. Total Depth: 20'

B. Boring Diameter: 8"

Drilling Method: Hollow Stem Auger

C. Casing Length: 20'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 8'

F. Perforated Length: 12'

Perforation Type: Machined Slot

Perforation Size: 0.010"

G. Surface Seal: 4'

Seal Material: Neat Cement

H. Seal: 2'

Seal Material: Bentonite

I. Filter Pack: 14'

Pack Material: RMC Lonestar Sand

Size: #2/12

J. Bottom Seal: None

Seal Material: N/A

595 413621A 03S02W06C24

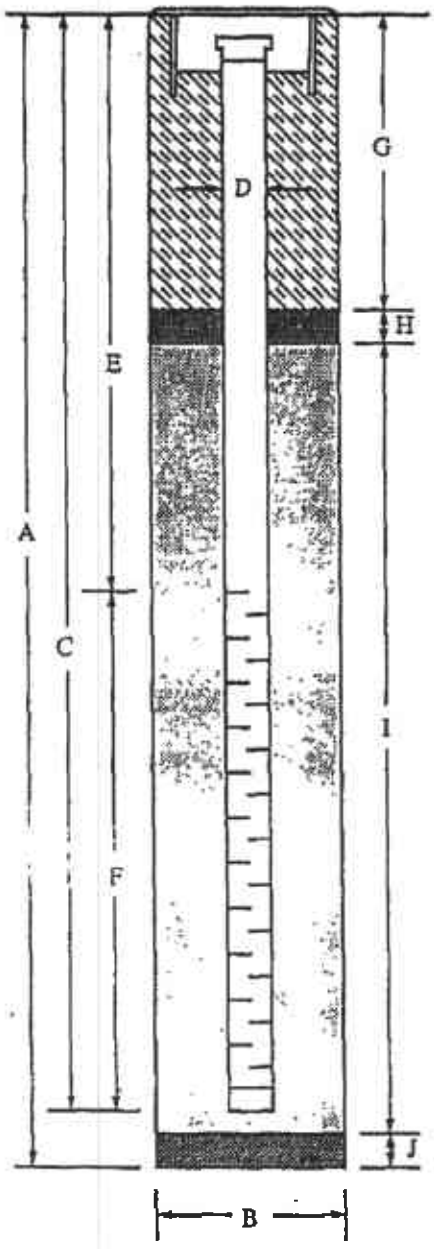
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal S/S #3292, 15008 E. 14th, San Leandro WELL NO. MW10

PROJECT NUMBER: KEI-P91-0102

WELL PERMIT NO.:

Flush-mounted Well Cover



A. Total Depth: 20'

B. Boring Diameter: 8"

Drilling Method: Hollow Stem Auger

C. Casing Length: 20'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 8'

F. Perforated Length: 12'

Perforation Type: Machined Slot

Perforation Size: 0.010"

G. Surface Seal: 4'

Seal Material: Neat Cement

H. Seal: 2'

Seal Material: Bentonite

I. Filter Pack: 14'

Pack Material: RMC Lonestar Sand

Size: #2/12

J. Bottom Seal: None

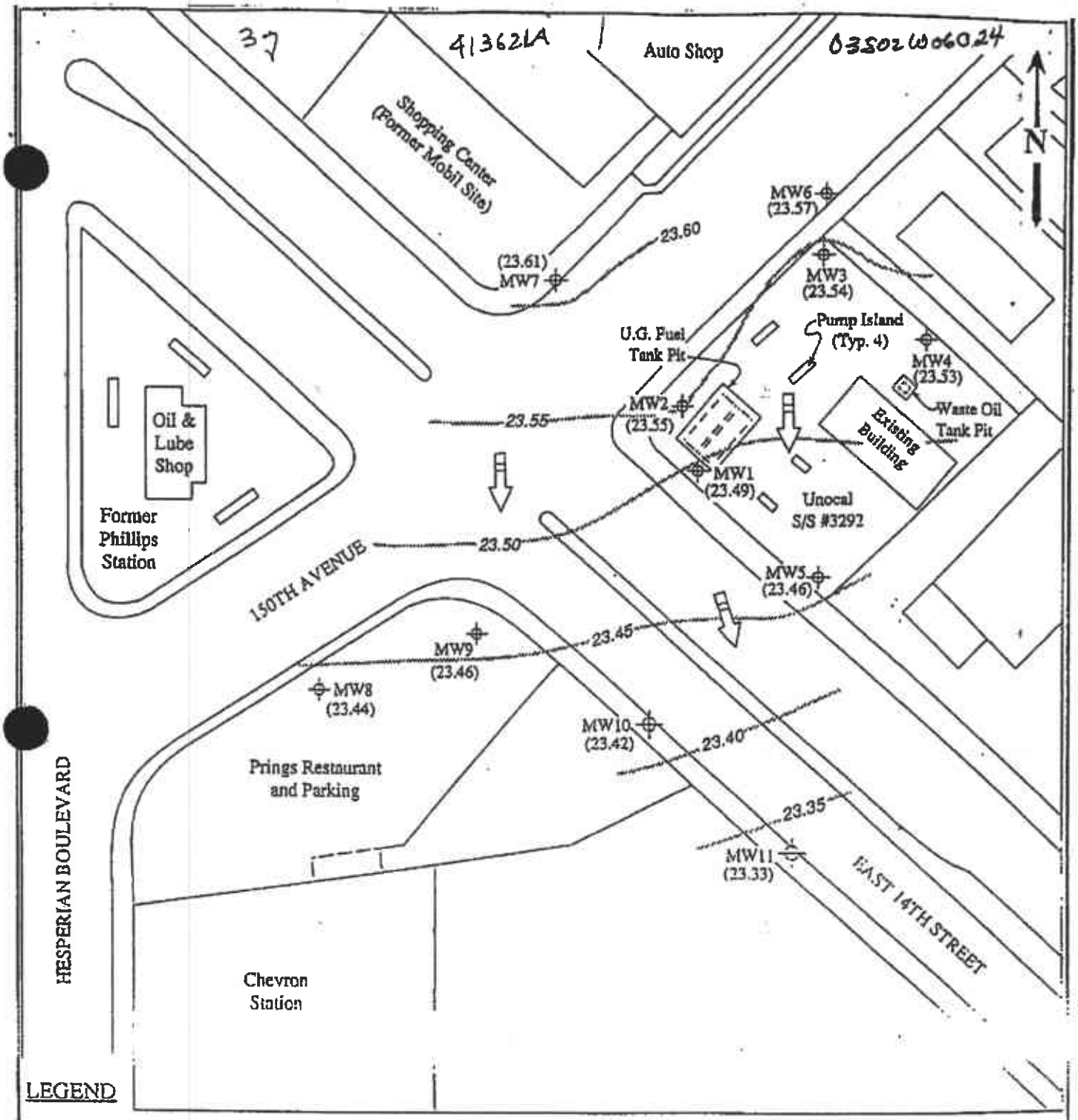
Seal Material: N/A

475 413621A 03502W06C24

BORING LOG

Project No. KEI-P91-0102	**Boring Diameter** 9" **Casing Diameter** 2"	**Logged By** JGG **D.L.** CEG 1633
Project Name Unocal S/S #3292 15008 E. 14th, San Leandro	**Well Cover Elevation**	**Date Drilled** 8/13/92
Boring No. MW10	**Drilling Method** Hollow-stem Auger	**Drilling Company** Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		Concrete slab.
NO BLOW COUNT DATA - SAMPLES PUSHED				Sand and gravel mixed with black silty clay (fill and disturbed native soil).
			SC	Silty clay with trace sand and gravel, very stiff, moist, very dark brown (10YR 2/1) and black (10YR 1/1), mottled.
		5		Clayey sand with trace gravel to 3/4 inch in diameter, sand is fine to coarse-grained, medium dense, moist, dark brown (10YR 3/3), with iron-oxide stained root holes.
			ML	Silt with trace fine-grained sand, stiff, moist, dark greenish gray (5GY 4/1).
		10	CL	Silty clay, stiff, moist, dark gray (5Y 4/1), olive brown (2.5YR 4/4) below 10.5 feet with dark greenish gray (5GY 4/1) discolored root holes.
			MH	Clayey silt, stiff, moist, olive gray (5Y 4/2).
			CL	Silty clay, as at 11 feet.
			MH	Clayey silt, stiff, moist, olive gray (5Y 4/2).
	▽		SM	Silty sand with trace clay, sand is fine-grained, medium dense, wet, dark greenish gray (5GY 4/1).
			CH	Silty clay, stiff, moist, olive gray (5Y 4/2) and very dark grayish brown (10YR 3/2), mottled.
		15	ML	Silt and sandy silt, stiff, very moist to wet, dark greenish gray (5Y 4/1), sand is very fine to fine-grained.
			CH	Silty clay, stiff, moist, olive gray (5Y 4/1) with minor iron oxide staining.
				Clay with silt and trace sand, stiff, moist, very dark brown (10YR 2/2) and very dark gray (10YR 3/1), mottled, minor caliche.
		20		TOTAL DEPTH 20'



POTENTIOMETRIC SURFACE MAP FOR AUGUST 20, 1992 MONITORING EVENT.

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION #3292
15008 E. 14TH STREET
SAN LEANDRO, CA

FIGURE
1

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

35/2W 6C19
413821A

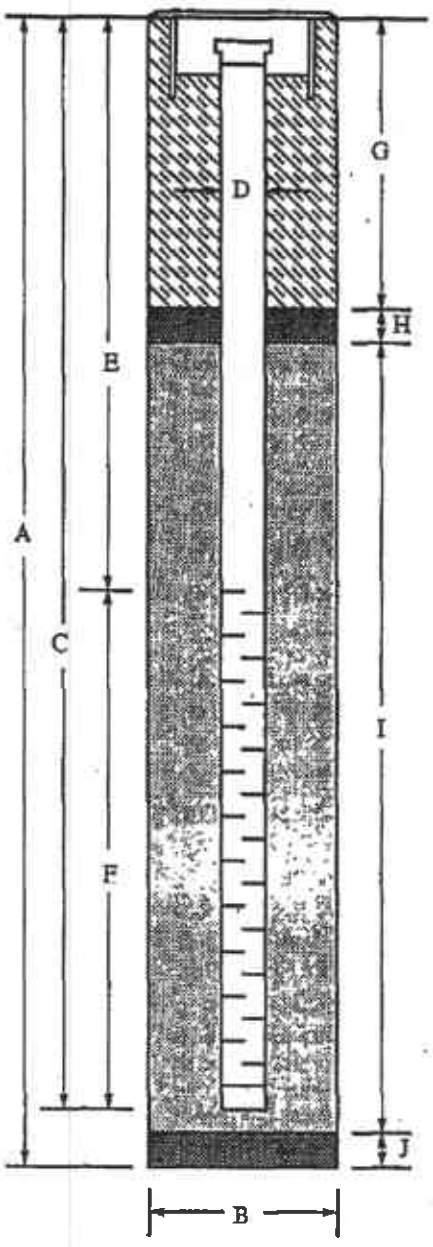
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal S/S #3292, 15008 E. 14th, San Leandro WELL NO. MW11

PROJECT NUMBER: KEI-P91-0102

WELL PERMIT NO.:

Flush-mounted Well Cover



A. Total Depth: 20'

B. Boring Diameter: 8"

Drilling Method: Hollow Stem Auger

C. Casing Length: 19'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 7'

F. Perforated Length: 12'

Perforation Type: Machined Slot

Perforation Size: 0.010"

G. Surface Seal: 3'

Seal Material: Neat Cement

H. Seal: 2'

Seal Material: Bentonite

I. Filter Pack: 14'

Pack Material: RMC Lonestar Sand

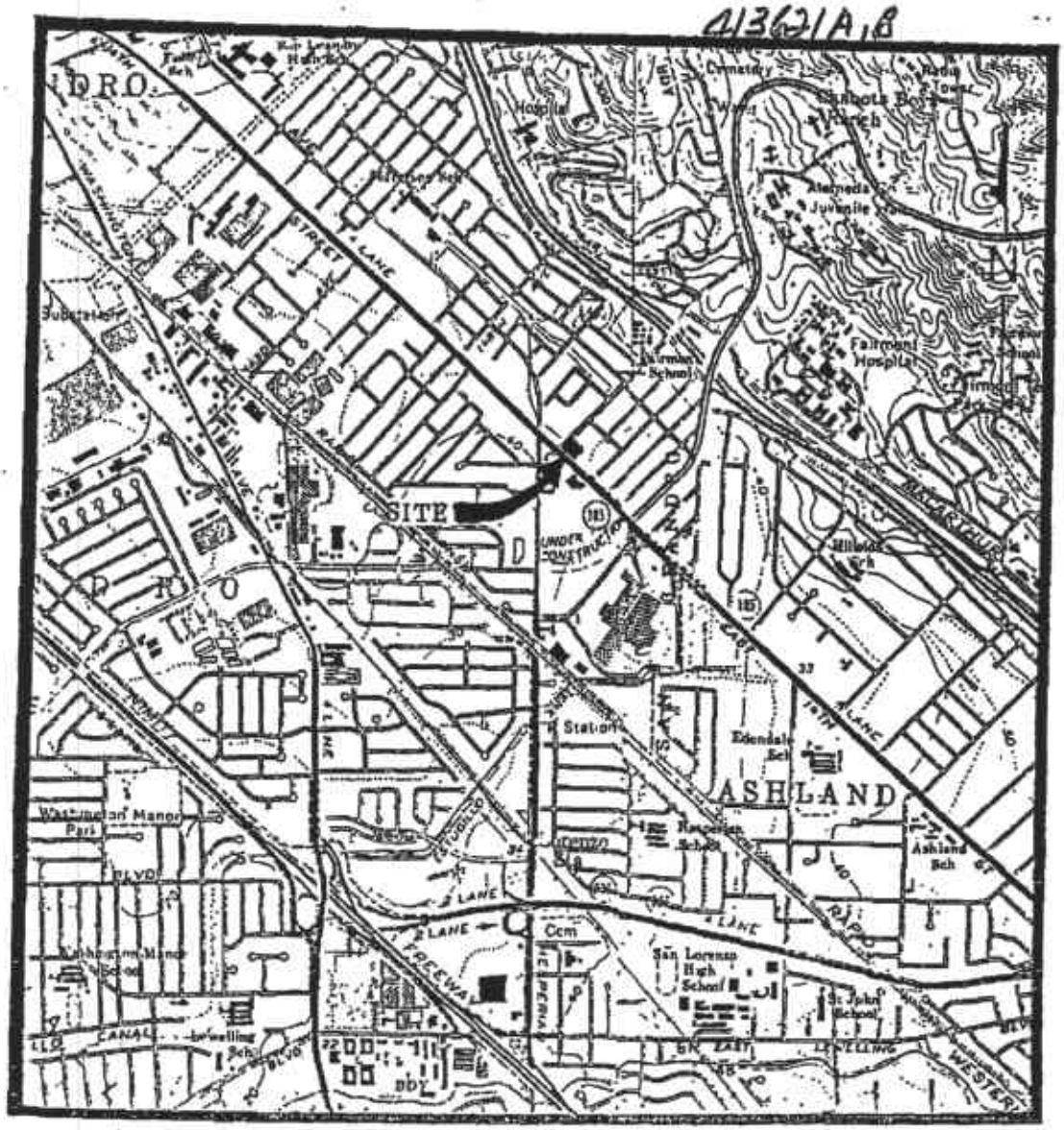
Size: #2/12

J. Bottom Seal: 1'

Seal Material: Bentonite

35/2W 6C 18 & 19

413621A,B



Base modified from 7.5 minute U.S.G.S. Hayward and San Leandro Quadrangles (both photorevised 1980)

0 2000 4000

Approx. scale feet

KAPREALIAN ENGINEERING INCORPORATED

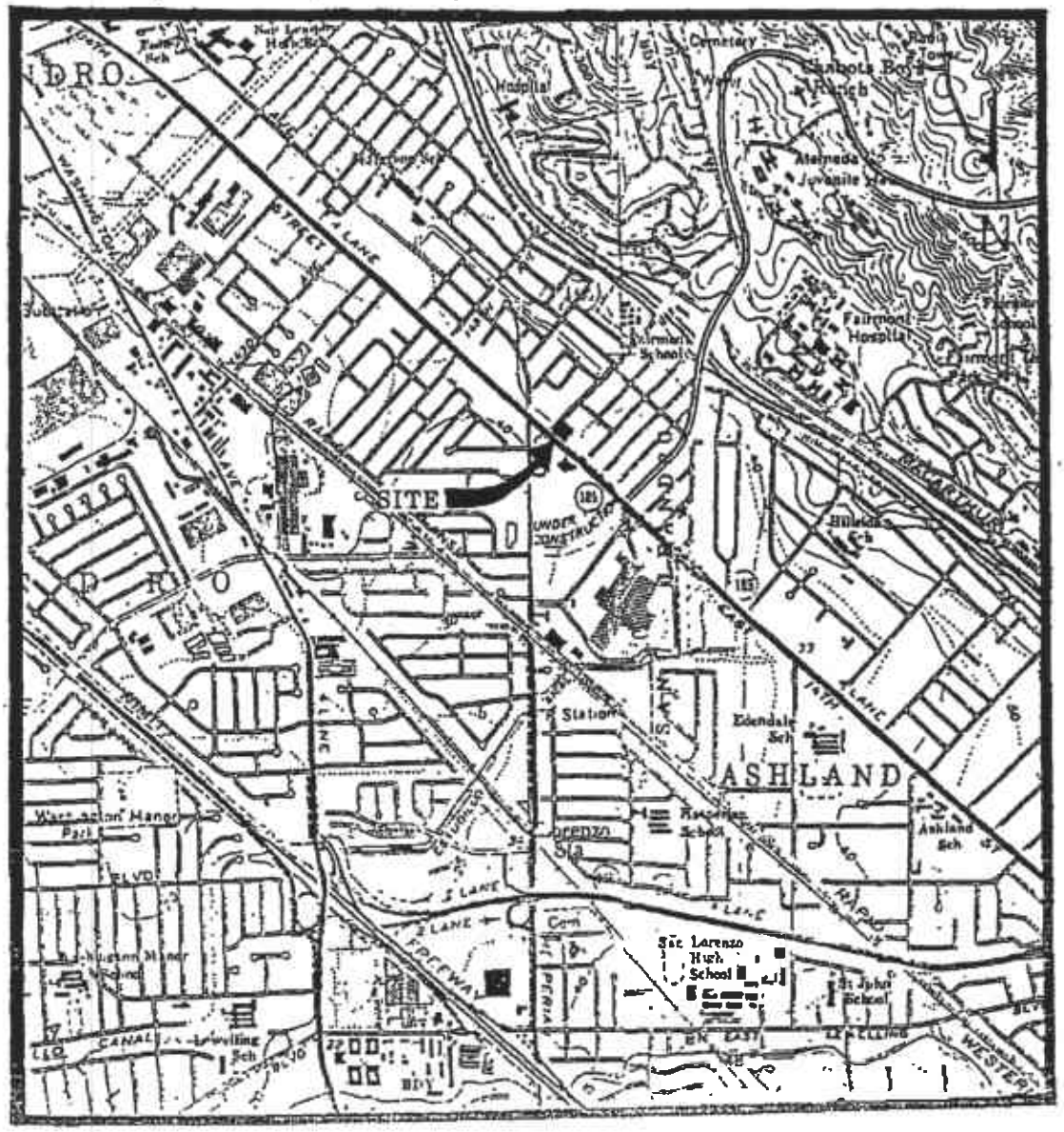
UNOCAL SERVICE STATION #3292
15008 EAST 14TH STREET
SAN LEANDRO, CA

LOCATION MAP

03S02W06C24-25

24

413621A-B

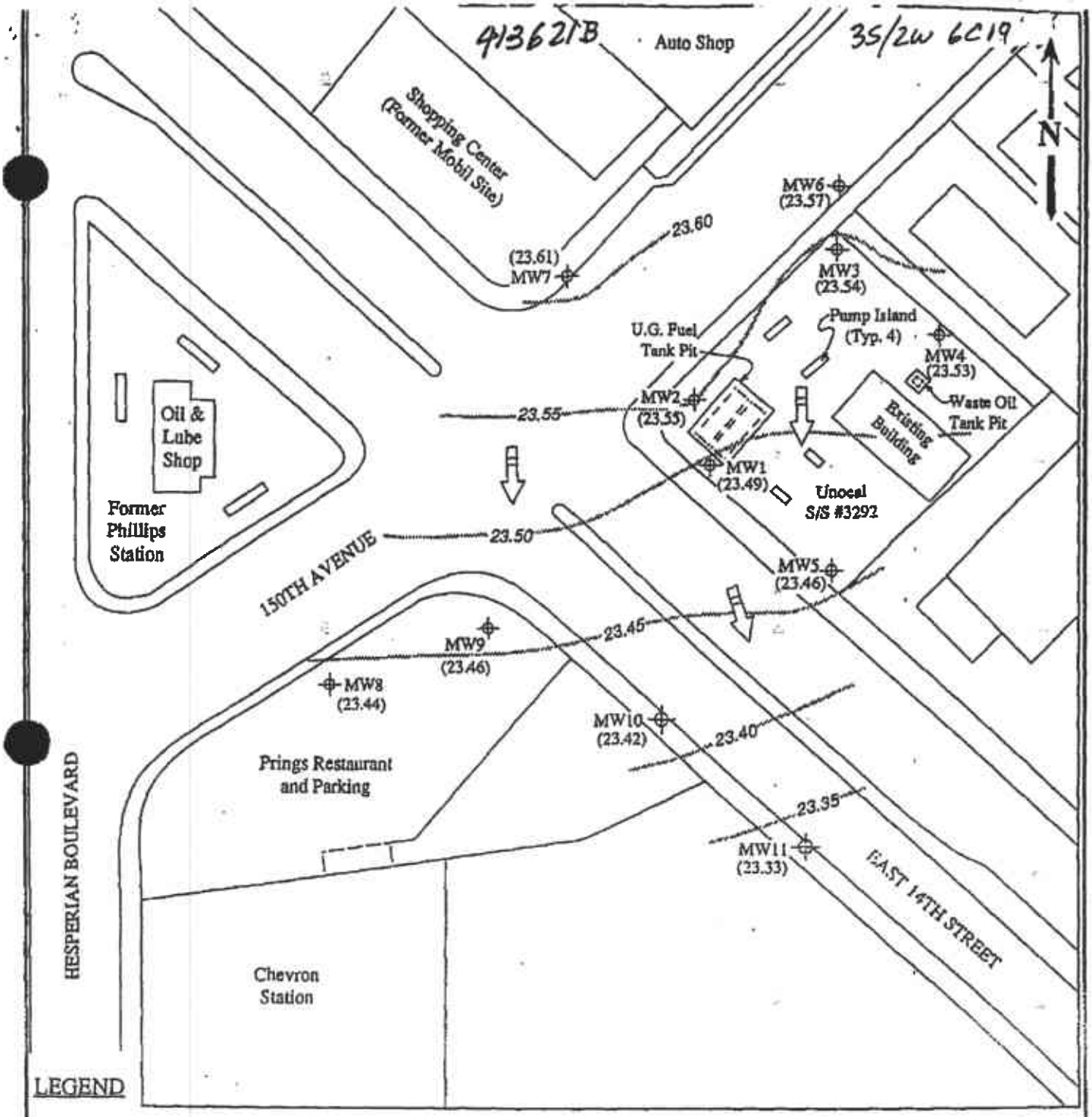


Base modified from 7.5 minute U.S.G.S. Hayward and San Leandro Quadrangles (both photorevised 1980)

0 2000 4000

Approx. scale feet

KAPREALIAN ENGINEERING INCORPORATED	UNOCAL SERVICE STATION #3292 15008 EAST 14TH STREET SAN LEANDRO, CA	LOCATION MAP



POTENTIOMETRIC SURFACE MAP FOR AUGUST 20, 1992 MONITORING EVENT.

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION #3292
15008 E. 14TH STREET
SAN LEANDRO, CA

FIGURE 1

3S/2W 6C19

4136218

BORING LOG

Project No. KEI-P91-0102	**Boring Diameter** 9" **Casing Diameter** 2"	**Logged By** JGG **D.L.** CEG 1633
Project Name Unocal S/S #3292 15008 E. 14th, San Leandro	**Well Cover Elevation**	**Date Drilled** 8/13/92
Boring No. MW11	**Drilling Method** Hollow-stem Auger	**Drilling Company** Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
NO BLOW COUNT DATA - SAMPLES PUSHED	▼	0		Concrete slab.
				Sand and gravel mixed with black silty clay: fill and disturbed native soil.
			CL	Silty clay with trace sand and gravel, very stiff, moist, black (10YR 2/1).
		5	SC	Clayey sand with trace silt, sand is fine to coarse-grained, medium dense, moist, dark brown (10YR 3/3).
			CH	Silty clay, stiff, moist, dark olive gray (5Y 4/2), olive gray (5Y 4/2) below 10 feet, with root holes, root holes are discolored, dark greenish gray below (5GY 4/1) below 10 feet.
		10	MH	Clayey silt with trace fine-grained sand, stiff, moist to very moist, olive gray (5Y 4/2), grading to dark greenish gray (5GY 4/1) below 12.5 feet with root holes.
		15	ML	Silt with sand, sand is very fine-grained, stiff, very moist, dark greenish gray (5GY 4/1).
			SP	Poorly graded sand, fine-grained, trace silt, medium dense, saturated, dark greenish gray (5GY 4/1).
				Silty clay, stiff, moist, dark greenish gray (5GY 4/1).
			CH	Clay with silt and trace sand, stiff, moist, very dark brown (10YR 2/2) and very dark gray (10YR 3/1), mottled, with trace caliche.
			MH	Clayey silt, stiff, moist olive gray (5Y 4/2).
		20	CL	Silty clay, stiff, moist, dark greenish gray (5GY 4/1).
				TOTAL DEPTH 20'

595 4/3621B 4/3621B 03S02W06C25

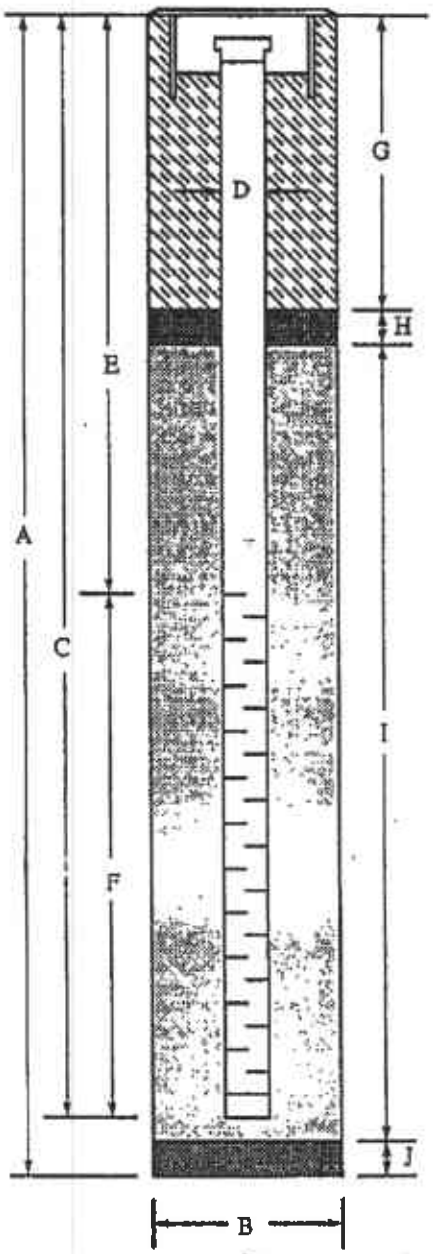
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal S/S #3292, 15008 E. 14th, San Leandro WELL NO. MW11

PROJECT NUMBER: KEI-P91-0102

WELL PERMIT NO.:

Flush-mounted Well Cover



A. Total Depth: 20'

B. Boring Diameter: 8"

Drilling Method: Hollow Stem Auger

C. Casing Length: 19'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 7'

F. Perforated Length: 12'

Perforation Type: Machined Slot

Perforation Size: 0.010"

G. Surface Seal: 3'

Seal Material: Neat Cement

H. Seal: 2'

Seal Material: Bentonite

I. Filter Pack: 14'

Pack Material: RMC Lonestar Sand

Size: #2/12

J. Bottom Seal: 1'

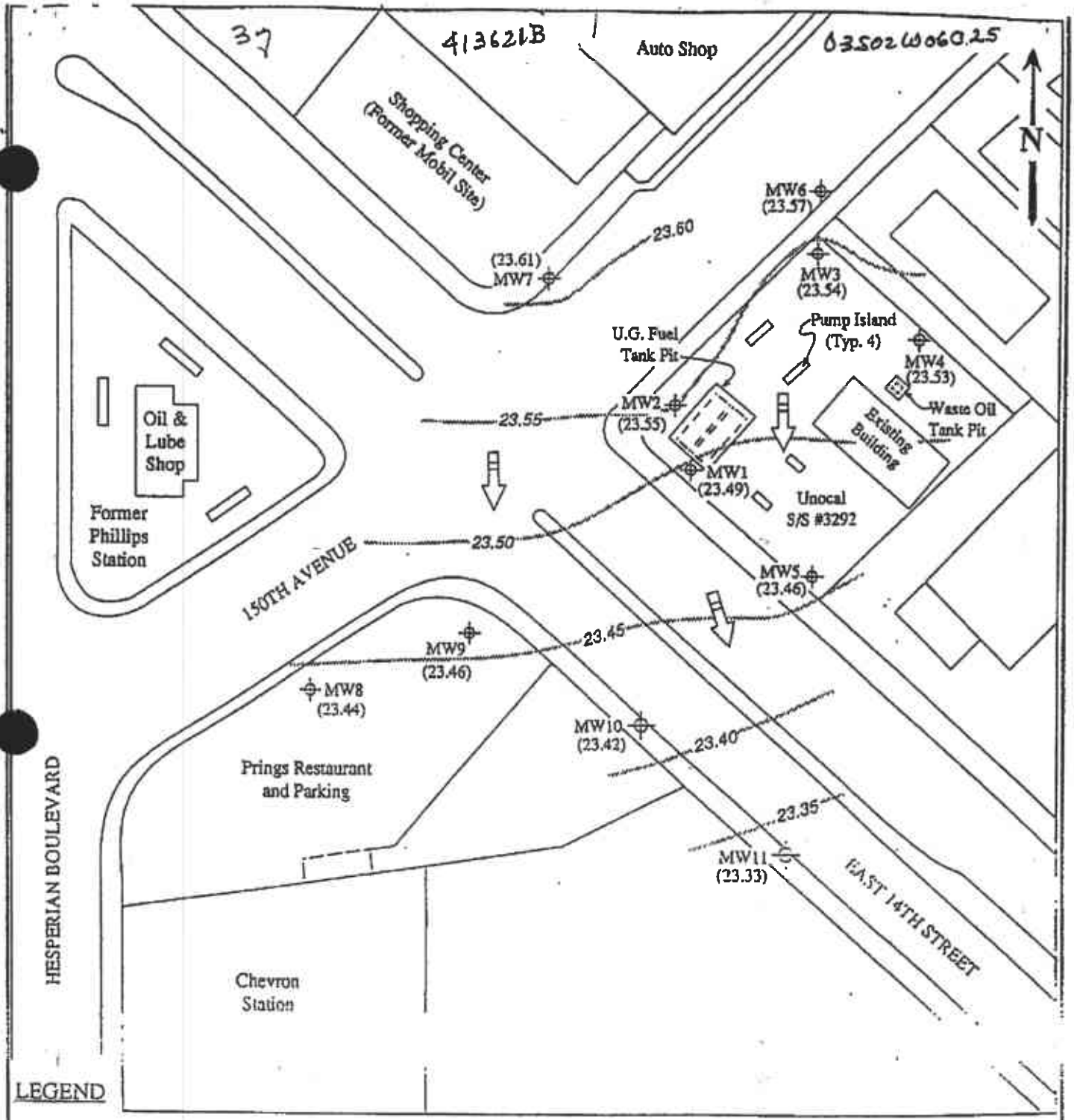
Seal Material: Bentonite

445 413621B 03502W06C25

BORING LOG

Project No. KEI-P91-0102	**Boring Diameter** 9" **Casing Diameter** 2"	**Logged By** JGG **D.L.** CEG 1633
Project Name Unocal S/S #3292 15008 E. 14th, San Leandro	**Well Cover Elevation**	**Date Drilled** 8/13/92
Boring No. MW11	**Drilling Method** Hollow-stem Auger	**Drilling Company** Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
NO BLOW COUNT DATA - SAMPLES PUSHED	▼	0		Concrete slab.
				Sand and gravel mixed with black silty clay: fill and disturbed native soil.
			CL	Silty clay with trace sand and gravel, very stiff, moist, black (10YR 2/1).
		5	SC	Clayey sand with trace silt, sand is fine to coarse-grained, medium dense, moist, dark brown (10YR 3/3).
			CH	Silty clay, stiff, moist, dark olive gray (5Y 4/2), olive gray (5Y 4/2) below 10 feet, with root holes, root holes are discolored, dark greenish gray below (5GY 4/1) below 10 feet.
		10	MH	Clayey silt with trace fine-grained sand, stiff, moist to very moist, olive gray (5Y 4/2), grading to dark greenish gray (5GY 4/1) below 12.5 feet with root holes.
		15	ML	Silt with sand, sand is very fine-grained, stiff, very moist, dark greenish gray (5GY 4/1).
			SP	Poorly graded sand, fine-grained, trace silt, medium dense, saturated, dark greenish gray (5GY 4/1).
				Silty clay, stiff, moist, dark greenish gray (5GY 4/1).
			CH	Clay with silt and trace sand, stiff, moist, very dark brown (10YR 2/2) and very dark gray (10YR 3/1), mottled, with trace caliche.
			MH	Clayey silt, stiff, moist olive gray (5Y 4/2).
		20	CL	Silty clay, stiff, moist, dark greenish gray (5GY 4/1).
				TOTAL DEPTH 20'



POTENTIOMETRIC SURFACE MAP FOR AUGUST 20, 1992 MONITORING EVENT.

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #3292
15008 E. 14TH STREET
SAN LEANDRO, CA

FIGURE
1

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

CONFIDENTIAL

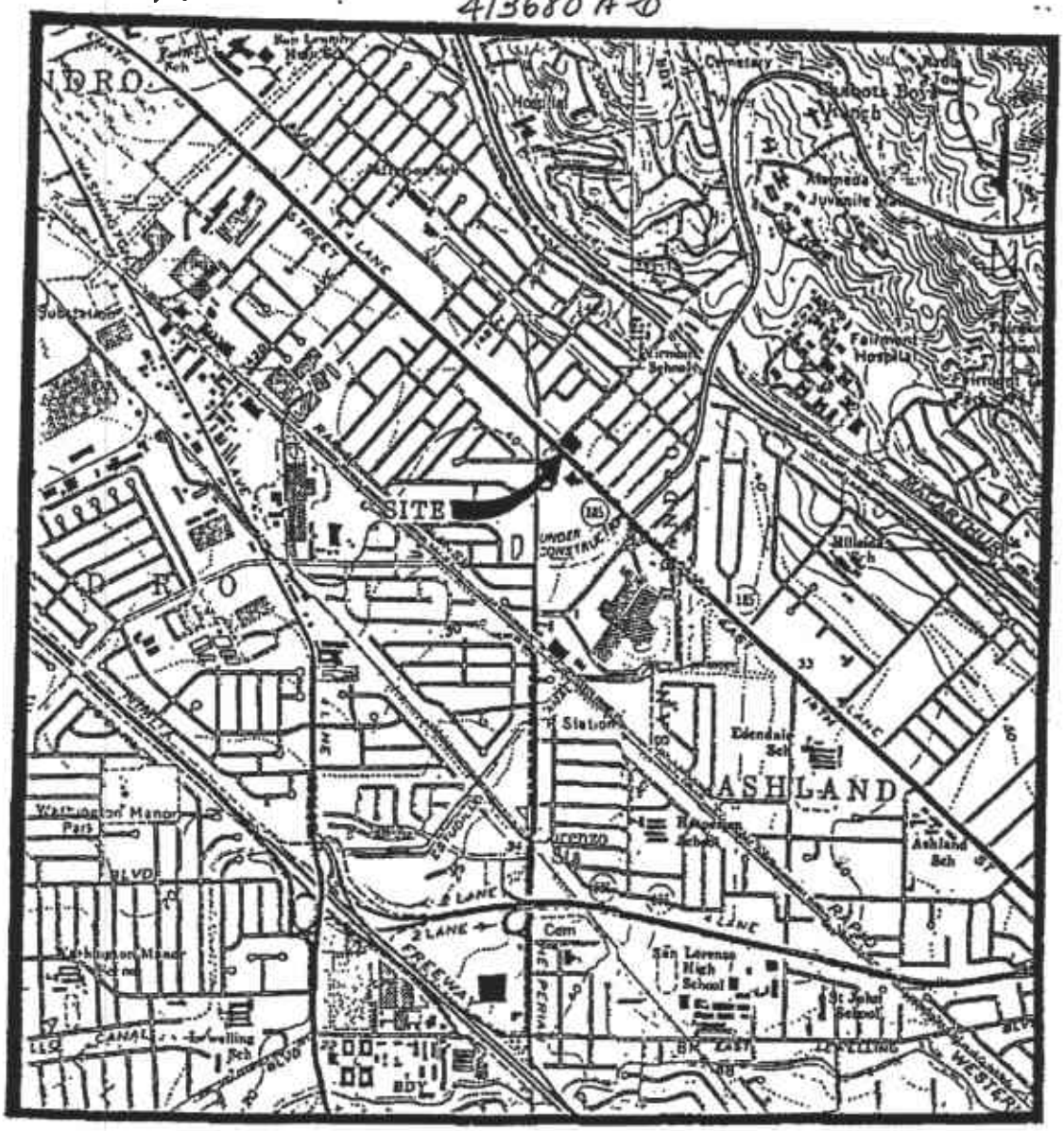
STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

35/2W 6C 20-23

2-5

413680 A-D



Base modified from 7.5 minute U.S.G.S. Hayward and San Leandro Quadrangles (both photorevised 1980)

0 2000 4000

Approx. scale feet

KAPREALIAN ENGINEERING INCORPORATED	UNOCAL SERVICE STATION #3292 15008 EAST 14TH STREET SAN LEANDRO, CA	LOCATION MAP

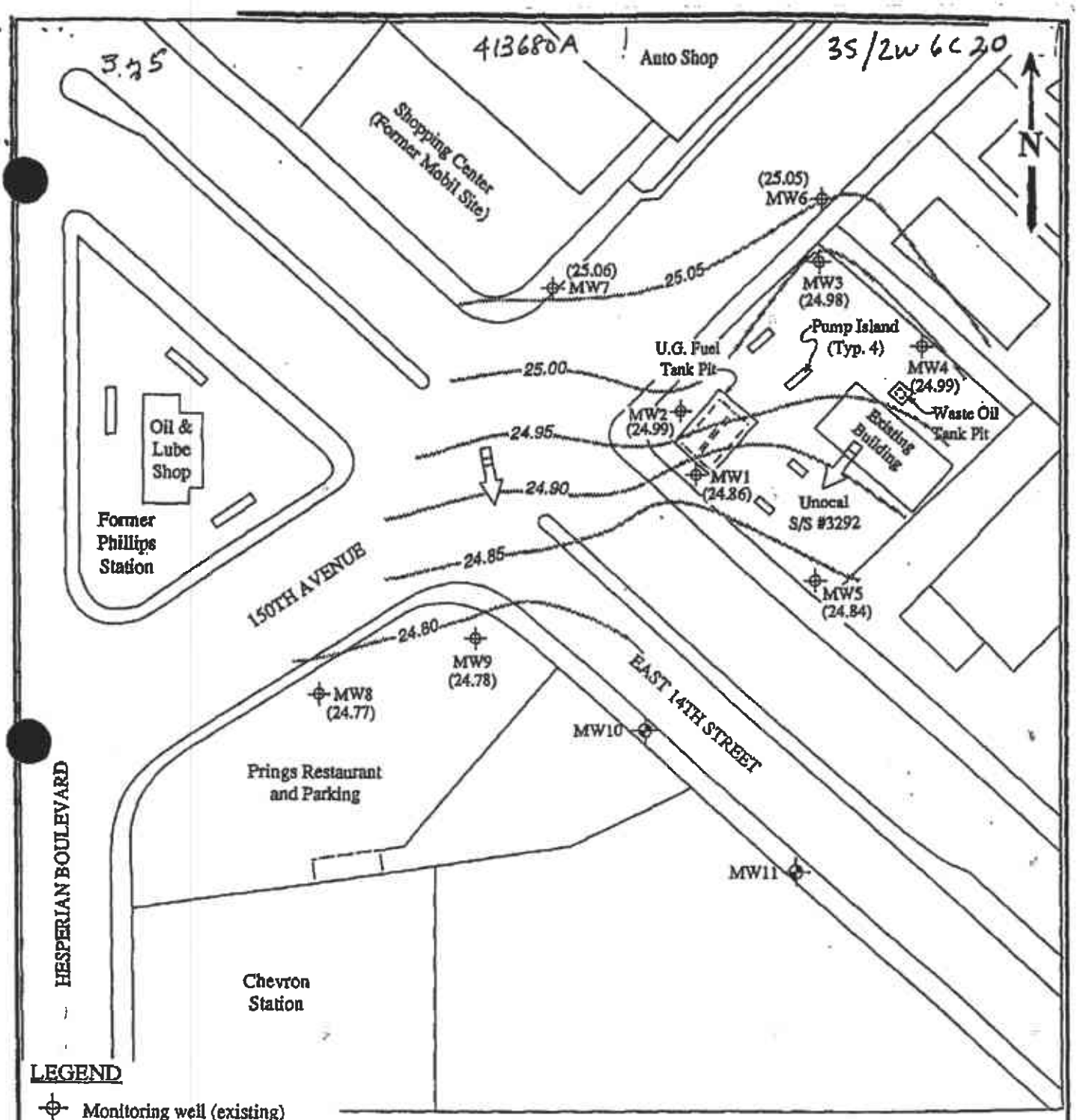


FIGURE 1. POTENTIOMETRIC SURFACE MAP FOR MAY 19, 1992 MONITORING EVENT.

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION #3292
15008 E. 14TH STREET
SAN LEANDRO, CA

FIGURE 1

413680A 3S/2W 6C20

4 of 5

BORING LOG

Project No. KEI-P91-0101	**Boring & Casing Diameter** 9" 2"	**Logged By** JGG D.L. EG 1633
Project Name Unocal S/S #3292 15008 E. 14th, San Leandro	**Well Cover Elevation**	**Date Drilled** 5-5-92
Boring No. MW6	**Drilling Method** Hollow-stem Auger	**Drilling Company** Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		Asphalt pavement over sand and gravel base.
NO BLOW COUNT DATA-CONTINUOUSLY CORED			CL	Clay, very stiff, slightly moist, black.
				Silty clay, trace sand, stiff, moist, very dark grayish brown.
		5	SM	Silty sand, trace gravel to 3/4 inches in diameter, trace clay, sand is fine to coarse-grained, medium dense, moist, olive brown.
			ML	Sandy silt, trace clay, sand is fine to medium-grained, stiff, moist, olive brown.
No recovery 7 - 9.5 feet.			CH	Silty clay, stiff, moist, dark grayish brown and olive brown mottled with root holes.
		10		
	▽		ML	Sandy silt, trace clay, sand is fine to medium-grained, firm to stiff, wet, olive brown.
			SM	Silty sand, estimated at 15% silt, sand is fine to medium-grained, medium dense, saturated, dark greenish gray.
			ML/CL	Clayey silt, firm to stiff, moist to wet, olive brown and olive gray mottled, grades to olive gray, locally grades to very silty clay, occasional blocky texture.
		15		
			CH	Clay with silt, trace fine-grained sand, stiff, moist, olive brown and very dark grayish brown mottled.
			SC	Clayey sand, medium dense, moist, dark grayish brown.
			CL	Clay, very stiff, moist, black.
		20		TOTAL DEPTH: 20'

5/5 413680A 3S/2W 6C20

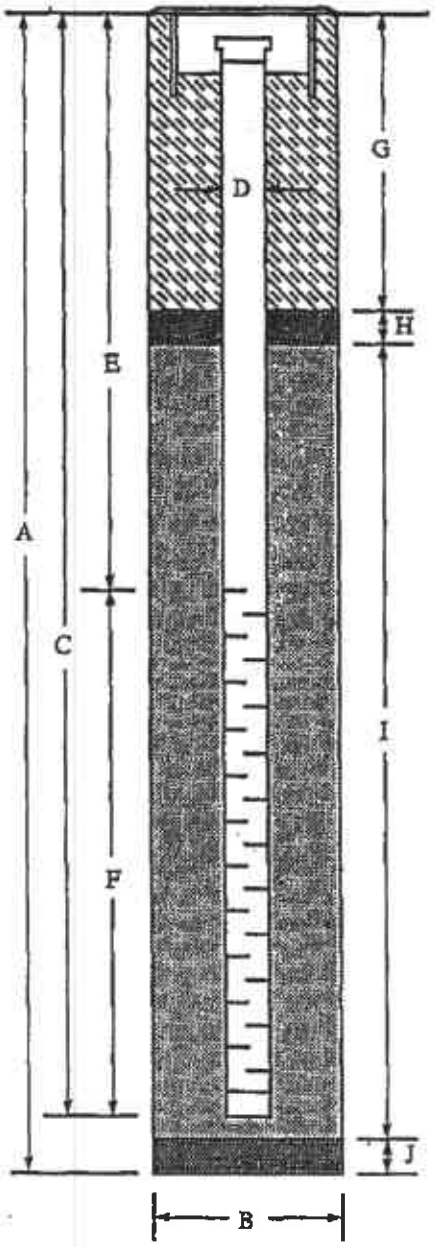
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal S/S #3292, 15008 E. 14th, San Leandro WELL NO. MW6

PROJECT NUMBER: KEI-P91-0102

WELL PERMIT NO.: ACFC & WCD 92201

Flush-mounted Well Cover



A. Total Depth: 20'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 20'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 8'

F. Perforated Length: 12'

Perforation Type: Machined Slot

Perforation Size: 0.010"

G. Surface Seal: 4'

Seal Material: Neat Cement

H. Seal: 2'

Seal Material: Bentonite

I. Filter Pack: 14'

Pack Material: RMC Lonestar Sand

Size: #2/12

J. Bottom Seal: None

Seal Material: N/A

* Boring diameter can vary from 8 1/4" to 9" depending on bit wear.

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

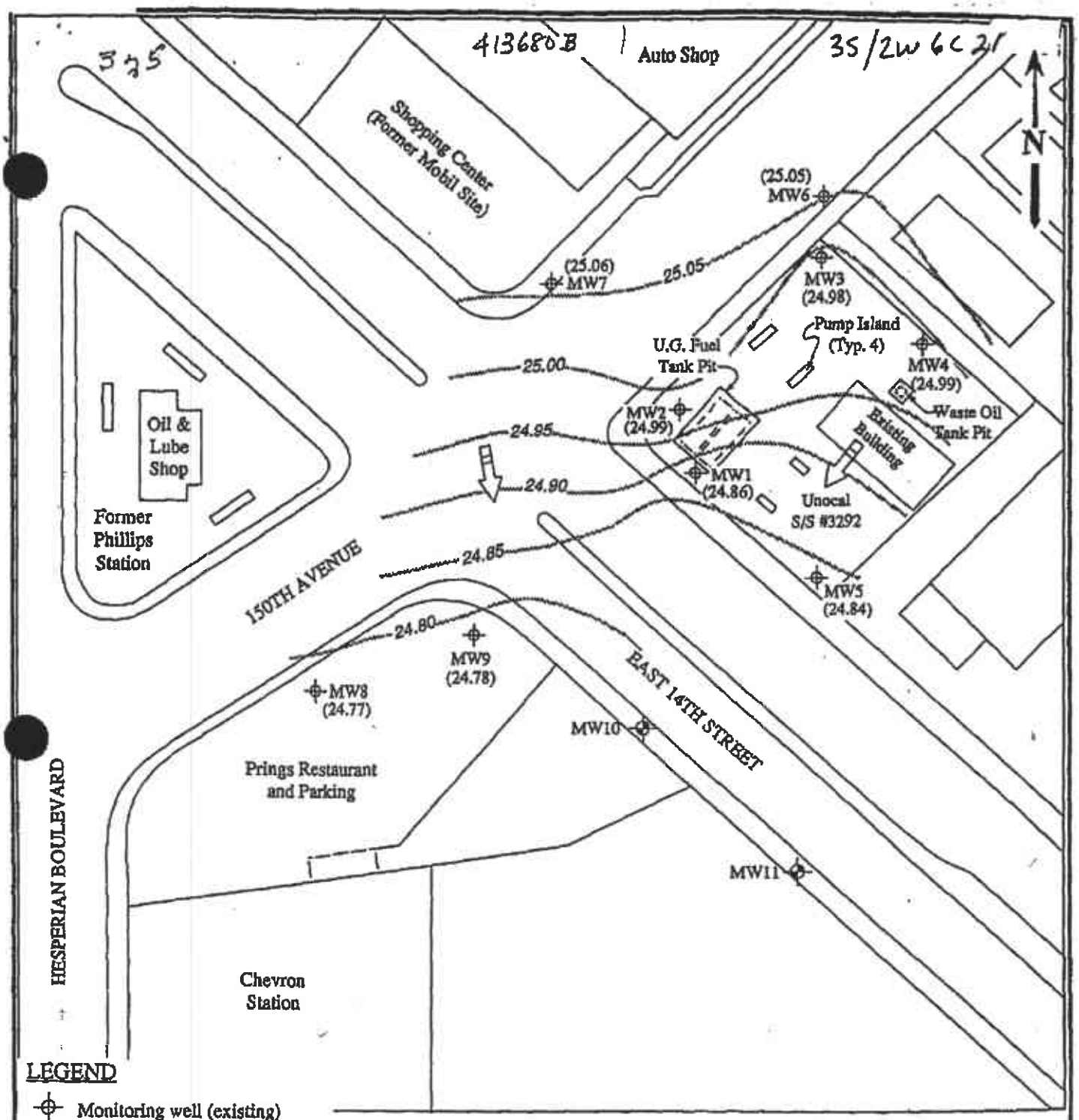


FIGURE 1. POTENTIOMETRIC SURFACE MAP FOR MAY 19, 1992 MONITORING EVENT.

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION #3292
15008 E. 14TH STREET
SAN LEANDRO, CA

FIGURE 1

~~#5~~ 413680 35/2W 6C21

BORING LOG

Project No. KEI-P91-0102	**Boring & Casing Diameter** 9" 2"	**Logged By** JGG D.L. EG 1633
Project Name Unocal S/S #3292 15008 E. 14th, San Leandro	**Well Cover Elevation**	**Date Drilled** 5-5-92
Boring No. MW7	**Drilling Method** Hollow-stem Auger	**Drilling Company** Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		Concrete slab over sand and gravel base.
NO BLOW COUNT DATA - SAMPLES PUSHED			ML/CL	Silt, clayey silt, and silty clay in pockets, with minor sand and gravel, soft to firm, moist, yellowish brown to black (fill and disturbed native soil).
		5		
Very poor recovery at 7.5 feet.			CL/SM	Pocketed clay, silt, and sand, soft, moist (fill).
			CH	Silty clay, stiff, moist, olive brown and dark grayish brown mottled, very dark gray discolored root holes, occasionally wet inside root holes.
		10		Silty clay as above except olive brown.
			ML	Silt, trace very fine-grained sand, firm, wet, olive gray.
			MH	Clayey silt, firm to stiff, very moist, dark olive gray, root holes common.
		15	ML	Sandy silt, trace clay, sand is very fine-grained, firm to stiff, wet, dark olive gray.
			CH	Clay with silt, trace very fine-grained sand, stiff, moist, very dark grayish brown and dark gray mottled. Lenses of grayish brown clayey silt below 19.5 feet.
		20		Clay, very stiff, moist, black, trace caliche.
				TOTAL DEPTH: 21.5'

5795 4136808 35/2W 6C21

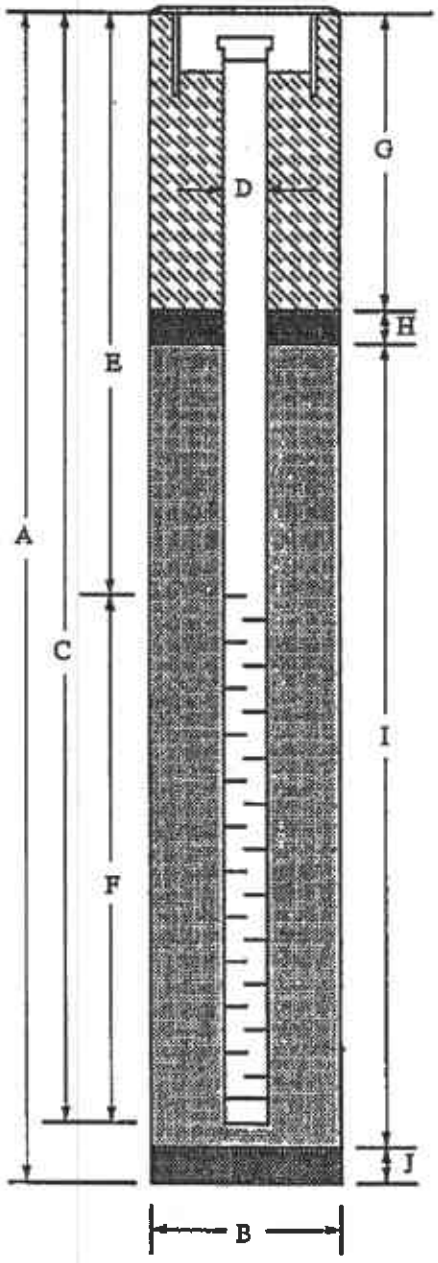
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal S/S #3292, 15008 E. 14th, San Leandro WELL NO. MW7

PROJECT NUMBER: KEI-P91-0102

WELL PERMIT NO.: ACF & WCD 92201

Flush-mounted Well Cover



A. Total Depth: 21.5'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 21.5'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 11'

F. Perforated Length: 10.5'

Perforation Type: Machined Slot

Perforation Size: 0.010

G. Surface Seal: 8'

Seal Material: Neat Cement

H. Seal: 2'

Seal Material: Bentonite

I. Filter Pack: 11.5'

Pack Material: RMC Lonestar Sand

Size: #2/12

J. Bottom Seal: None

Seal Material: N/A

* Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

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WELL COMPLETION REPORT
(WELL LOGS)

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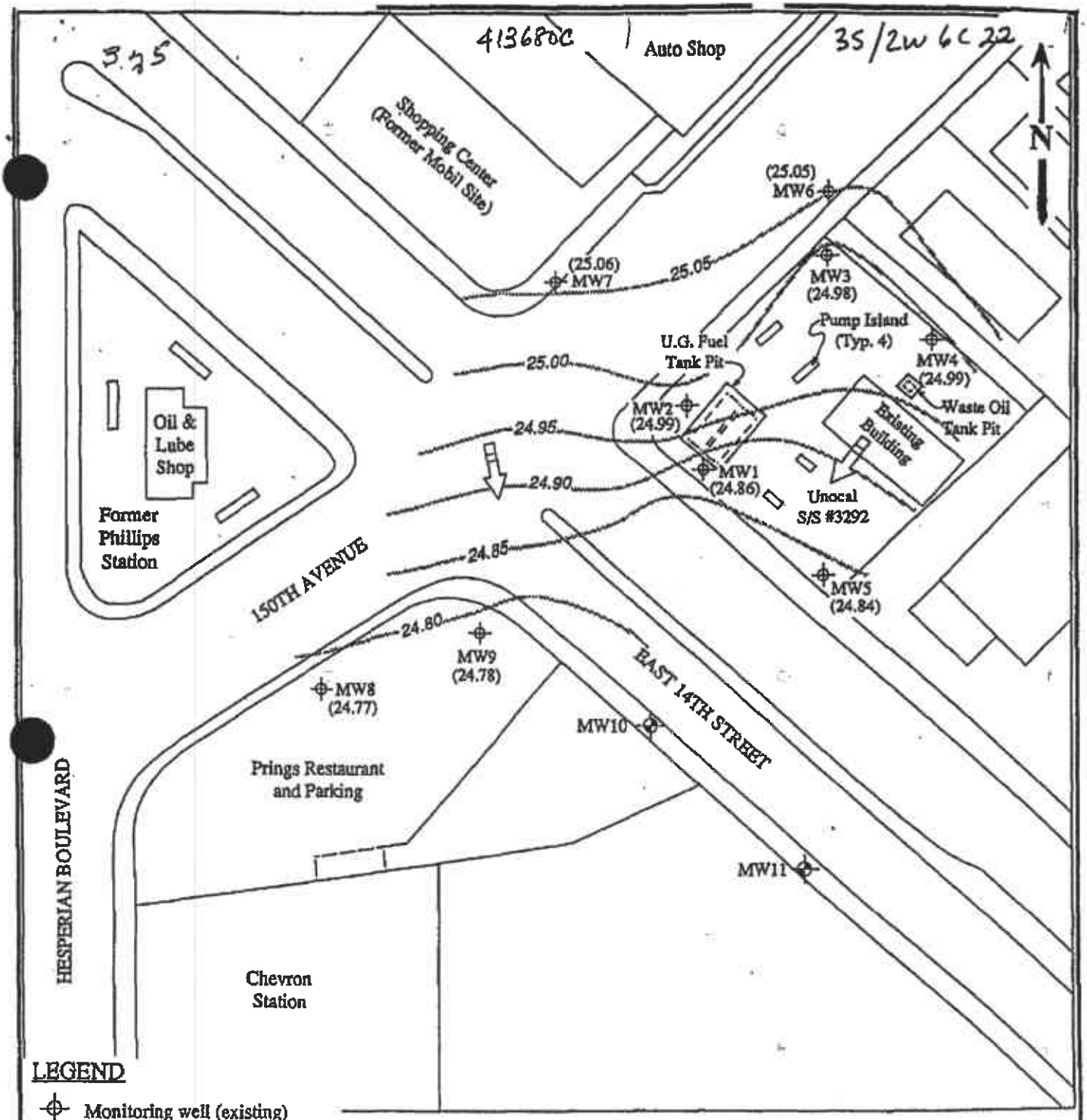


FIGURE 1. POTENTIOMETRIC SURFACE MAP FOR MAY 19, 1992 MONITORING EVENT.

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION #3292
15008 E. 14TH STREET
SAN LEANDRO, CA

FIGURE 1

475 413680c 3S/2W 6C22

BORING LOG

Project No. KEI--91-0102	**Boring & Casing Diameter** 9" 2"	**Logged By** JGG W.W. EG 1633
Project Name Unocal S/S #3292 15008 E. 14th, San Leandro	**Well Cover Elevation**	**Date Drilled** 5/6/92
Boring No. MW8	**Drilling Method** Hollow-stem Auger	**Drilling Company** Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		2 inches of asphalt pavement and 4 inches of concrete pavement over sand and gravel base.
			CL	Silty clay, minor gravel, moist, grayish green.
			ML	Clayey silt, estimated at 25% clay, 5% sand and gravel to 1/2 inches in diameter, stiff, moist, very dark grayish brown.
7/9/13		5	CL	Clay, estimated at 10-15% fine sand and 5% subrounded gravel to 3/4 inches in diameter, trace silt, very stiff, moist, brown to dark yellowish brown.
4/7/9		10		Clay, stiff to very stiff, moist, light olive brown, root pores with decomposed rootlets common.
6/7/5			GC	Clayey gravel with well graded sand and well rounded gravel to 3/4 inches in diameter, moist, medium dense.
			ML	Clayey silt, estimated at 5% fine-grained sand, very moist, olive gray.
2/2/3			SC	Clayey sand with silt, estimated at 30% clay and 10-15% silt sand, well graded, saturated, greenish gray.
		15	CL	Clay, trace silt and sand, moist, firm, olive gray and light olive brown mottled, trace root pores.
			ML	Clayey silt, saturated, firm, greenish gray.
3/4/6			SM	Silty sand, estimated at 25% silt, sand is well sorted, fine grained, saturated, olive gray and greenish gray mottled,
4/5/7			CL/CH	Clay, high plasticity, trace silt, moist, stiff, gray and brown mottled, saturated root pores.
		20	CL	Sandy clay with silt, very moist, olive gray.
				TOTAL DEPTH: 19.0'

5y5 413680C 3S/2W 6C22

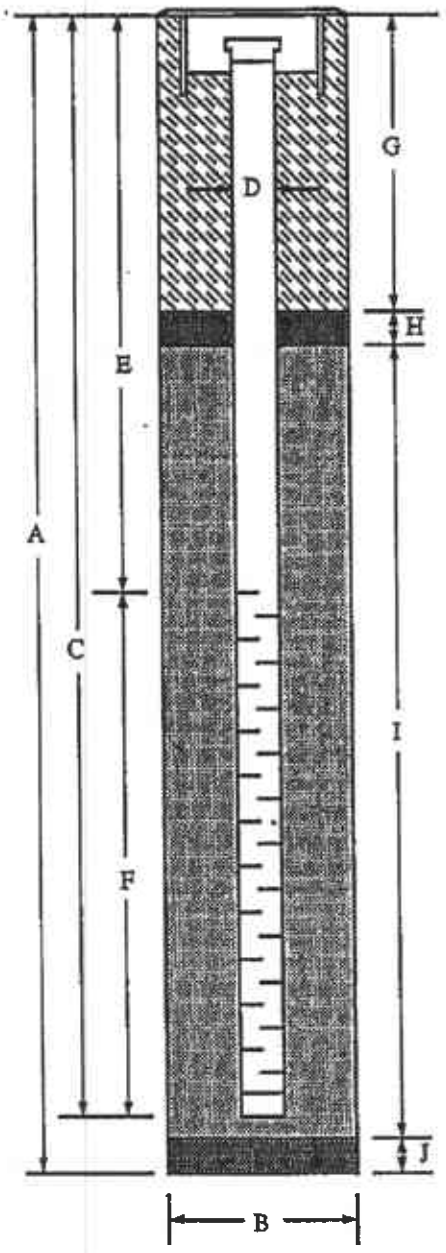
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal S/S #3292, 15008 E. 14th, San Leandro WELL NO. MW8

PROJECT NUMBER: KEI-P91-0102

WELL PERMIT NO.: ACFC & WCD 92201

Flush-mounted Well Cover



A. Total Depth: 20'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 19"

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 8'

F. Perforated Length: 11

Perforation Type: Machined Slot

Perforation Size: 0.010"

G. Surface Seal: 4'

Seal Material: Neat Cement

H. Seal: 2'

Seal Material: Bentonite

I. Filter Pack: 13'

Pack Material: RMC Lonestar Sand

Size: #2/12

J. Bottom Seal: 1'

Seal Material: Benton chips.

* Boring diameter can vary from 8 1/4" to 9" depending on bit wear.

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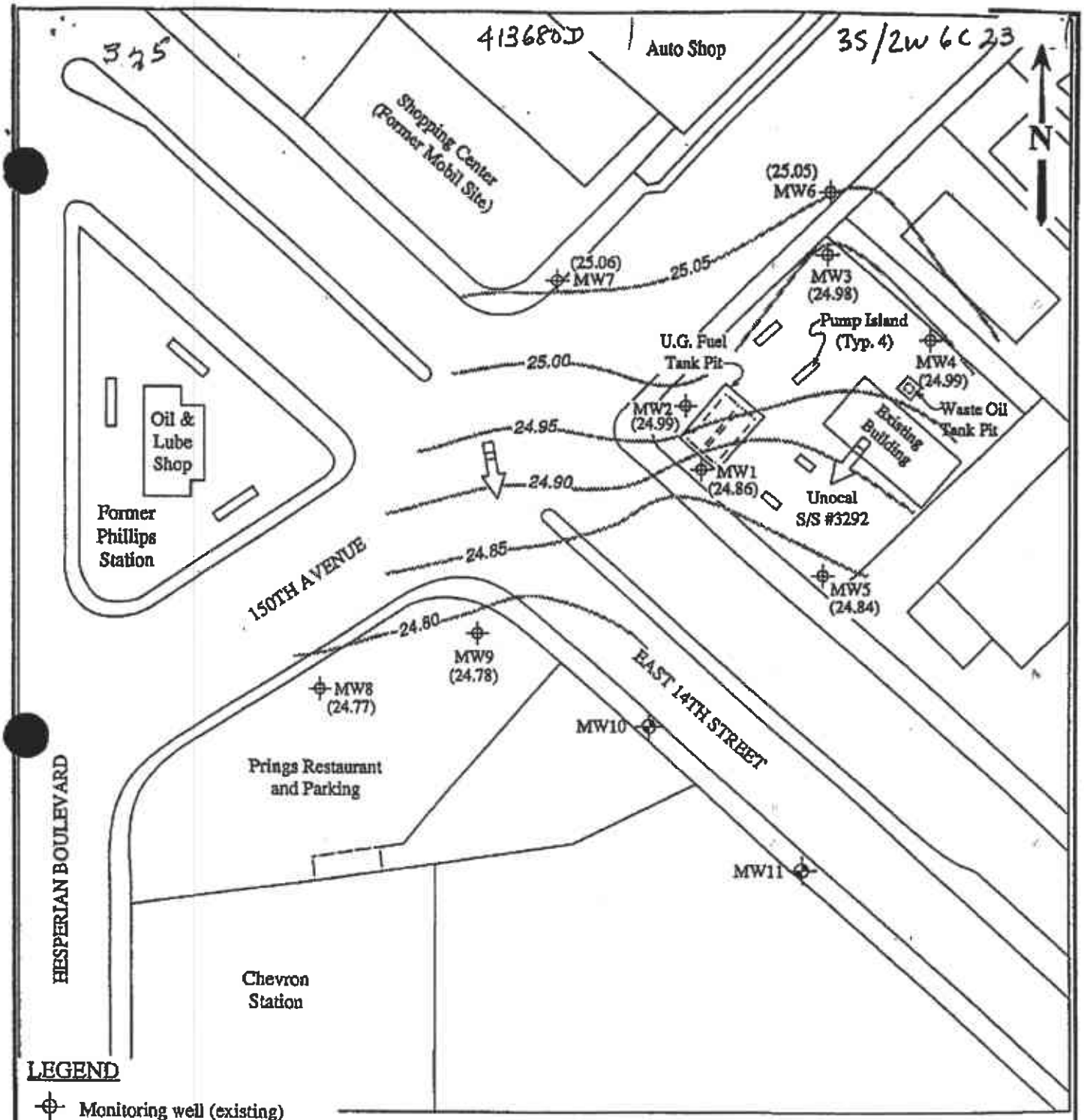


FIGURE 1. POTENTIOMETRIC SURFACE MAP FOR MAY 19, 1992 MONITORING EVENT.

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION #3292
15008 E. 14TH STREET
SAN LEANDRO, CA

FIGURE 1

4975 413680D 3S/2W 6C23

BORING LOG

Project No. KEI-P91-0102	**Boring & Casing Diameter** 9" 2"	**Logged By** W.W JGG EG 1633
Project Name Unocal S/S #3292 15008 E. 14th, San Leandro	**Well Cover Elevation**	**Date Drilled** 5/6/92
Boring No. MW9	**Drilling Method** Hollow-stem Auger	**Drilling Company** Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		2 inches of asphalt over 4 inches of concrete pavement.
			CL	Silty clay with fine sand, estimated at 15% fine-grained sand, trace gravel, yellowish brown.
				As above except dark grayish brown.
				Silty clay, estimated 20% silt, stiff, moist, very dark gray.
7/15/15		5		Silty clay, estimated 15-20% silt and 5% sand, minor gravel, very stiff, brown.
7/9/9		10		Clay, estimated at 5-10% silt, trace sand and caliche, very stiff, light olive brown and brownish gray, root pores common.
7/7/6				Clay, estimated at 5-10% silt, trace sand and caliche, stiff, very moist to saturated, grayish brown to light olive brown, root pores common.
				Clay as above, color change to gray and greenish gray.
4/5/6		15		Silty clay, estimated at 15% silt, stiff, saturated, greenish gray and light olive brown mottled, root pores common.
				Silty clay, estimated at 15-20% silt, trace sand, saturated, stiff, greenish gray and grayish brown mottled.
4/6/8			CL/CH	Clay, high plasticity, trace fine sand, stiff, moist, mottled brown and dark gray, trace root pores.
		20		TOTAL DEPTH 19'

575 4136800 3S/2W 6C23

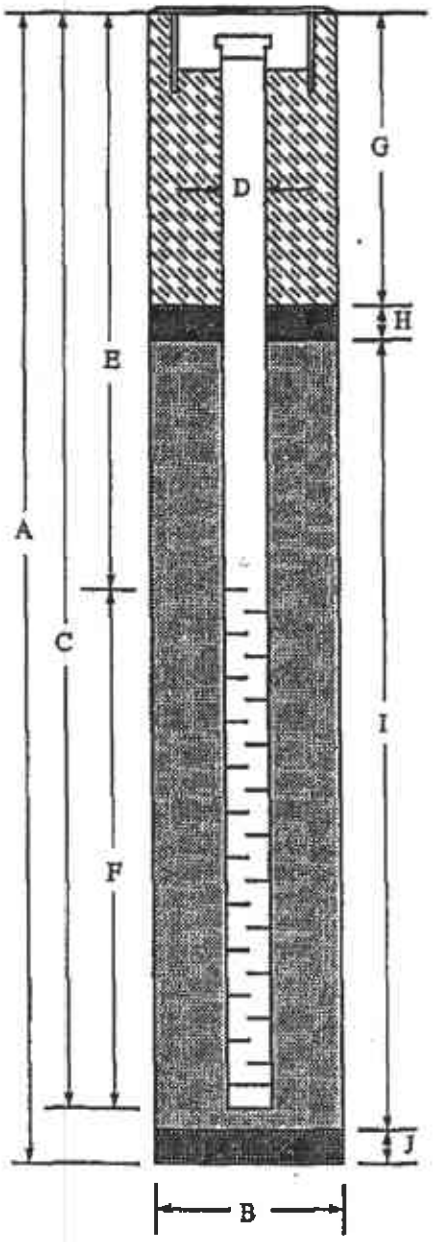
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal S/S #3292, 15008 E. 14th, San Leandro WELL NO. MW9

PROJECT NUMBER: KEI-P91-0102

WELL PERMIT NO.: ACFC & WCD 92201

Flush-mounted Well Cover



A. Total Depth: 19'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 19"

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 8'

F. Perforated Length: 11

Perforation Type: Machined Slot

Perforation Size: 0.010"

G. Surface Seal: 4'

Seal Material: Neat Cement

H. Seal: 2'

Seal Material: Bentonite

I. Filter Pack: 13'

Pack Material: RMC Lonestar Sand

Size: #2/12

J. Bottom Seal: None

Seal Material: N/A

* Boring diameter can vary from 8 1/4" to 9" depending on bit wear.

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